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THE PREHISTORY OF THE TEHUACAN VALLEY

Tehuacan Archaeological-Reconnaissance Project

THE PREHISTORY OF THE TEHUACAN VALLEY

VOLUME FIVE

Excavations and Reconnaissance

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This volume represents a compilation in terms of contextual studies, not only of all the artifacts and ecofacts we uncovered in our Tehuacan field endeavors from 1960 to 1965, but also of the results of the efforts of a large number of my colleagues both in the field and in the laboratory over a ten-year period. However, all of the materials and all of our endeavors could not have been possible without the aid and cooperation of three groups. First and foremost, we are indebted to the Republic of Mexico and to its officers in charge of archaeological investigation, specifically to Dr. Torres Bodet, then Minister of the Department of Education, to the late Dr. Eusebio Davalos, then Director of the Instituto Nacional de Antropología e Historia, and to Dr. José Luis Lorenzo, then Director of the Departamento de Prehistoria. While permission and aid of these individuals representing their government made our investigations possible, neither the research nor the preparation of manuscript could have been accomplished without considerable generous financial assistance from the National Science Foundation, which at various periods was under the direction of Dr. Albert C. Spaulding, Dr. Allan Smith, Dr. Richard Lieban, and Dr. John B. Cornell. Also, we would like to thank Dr. Edward J. Wellhausen, then of the Rockefeller Foundation, who was responsible for our receipt of very necessary funds during our first season in 1961. The third group we must thank is the staff of the Robert S. Peabody Foundation of Andover who sponsored and administered the research. Specifically, we owe a debt of gratitude to the former directors of that foundation, Mr. Douglas S. Byers and Dr. Frederick Johnson, Mr. John Kemper, the Headmaster of Phillips Academy, and the administrative assistant of the Foundation, Miss Theodora George.

Thanks to the generous efforts of the above-mentioned individuals of the various groups it was possible to collect the basic archaeological data in the field—here we owe much to many people. Perhaps first we should thank our many workmen from the Tehuacan

Valley who actually exhumed our basic materials. I hope they will forgive me for not giving their individual names, but, since such a list would run into the hundreds, space just does not permit it. However, whatever scientific value the materials they exhumed have, it is in large part due to the skill of the various directors of specific data collection projects, i.e., excavation and reconnaissance. Although this group is quite numerous and many will be either mentioned in or are co-authors of this volume, I would like to take this opportunity to thank them individually. This very important group includes Frederick Peterson, Dr. Melvin Fowler, Angel Garcia Cook, Dr. Frederick Johnson, Mr. Douglas S. Byers, Auturo Arbide, Robert Chadwick, Dr. James Neely, Dr. Richard Woodbury, and Edward B. Sisson.

Somewhat comparable to this group is another large one that also undertook data collection and analysis of basic materials, but more in the realm of interdisciplinary studies. I much appreciate their efforts and hope that in this volume we have interpreted their conclusions correctly. I will not mention their many names for they were authors of the previous four volumes.

The final group consists of those who specifically were involved in the writing of this volume or in preparing specific information for its various parts. Obviously, I appreciate the efforts of the authors themselves, but there are some unsung heroes whom I would like to thank. First are those individuals who worked in Miss Nelken's lab or in our lab in Tehuacan, Narciso and Agustín Tejeda, Mary Ann Neely, Jean King, Ann Harvey, and a host of students from the University of Calgary, including Ron Nash, David Sweetman, Ashley Baker, Carole Crumley, and Charles Eyman. Second, I owe a great debt of gratitude to Robert Vierra for his computer endeavors. And, last but not least, are my friends in Andover who put this volume to bed—Diana Gibney, our editor, her assistant, Julia Scton, the artists, Sally and Joe Landry

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This volume has been a long tough journey and has involved many people doing much hard work, and I appreciate all of their efforts. While none of us believe

the volume is perfect, we do believe it presents a great mass of basic information in a unique manner. We hope it will prove useful and be of interest to both our readers and to future archaeological investigators.

RICHARD S. MACNEISH

Andover, Massachusetts
December 1973

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The Prehistory of the Tehuacan Valley
EXCAVATIONS AND RECONNAISSANCE



Fig. 1. Galinat, MacNeish, and Mangelsdorf analyzing the maize.

CHAPTER 1

Introduction

Richard S. MacNeish and Antoinette Nelken-Terner

IN THIS VOLUME we place the data presented in Volumes 1-4 in context, this by description and interpretation of the archaeological reconnaissance of the Tehuacan Valley and by fuller descriptions of our excavations, which are, in fact, contextual interpretations of the artifacts and ecofacts that occurred in each occupation, be it level, stratum, or zone or parts thereof of each excavated or tested site. The question might well be asked why such basic data should be presented this late in our series. The answer will be clear, when we discuss our overall strategy, that this is where such information should appear. By strategy we mean a plan or method oriented around a hierarchy of goals, and reaching toward a final objective.

Method and Theory

In paragraph 1, Chapter 1 of Volume 1, we stated

that "the ultimate objective of the Tehuacan Project was the discovery of processes and causes leading to the rise of primary civilization" and, inferentially, to cultural change. This statement is still true; but it was made ten years and over a million words ago, and we would like to rephrase it now as we discuss in more concrete terms some of our methodology for attaining these ultimate goals, the necessary prerequisite goals leading to our final objective, and our assumptions and conceptual framework underlying this methodology. We define our ultimate goals as the same as those of any science that attempts "to discover and formulate in general terms the conditions under which events of various kinds occur, the generalized statements of such determining conditions serving as explanations of the corresponding happenings" (Nagel, 1964).

In archaeology, what do we perceive "events of

various kinds" to be? We know that one event that we are concerned with is a collective one, the event of past human activities; and, since we cannot observe at firsthand such events, we must concern ourselves with examination of not only the material results of activities, preserved to us as artifacts and features, but also certain ecofacts, which, being, in a sense, modifications of Nature, are equally the results of past human behavior. We have assumed that such entities are reflections of ancient activities and, moreover, that the activities so manifested were part of a more encompassing system that might be called a cultural system, and that it in turn existed within and was interrelated with a more vast ecosystem.

This brings us to a consideration of our concept of a *cultural system*. Following others, we would define a system as "a complex of elements or components directly or indirectly related in a causal network such that at least some of the components are related to some others in a more or less stable way at any one time" (Odum, 1971). While such a definition emphasizes the aspect of stability of the relationships of the elements, we also take it to mean that there may be some sort of crucial point at which interrelationships become so unstable that the structure of the system, or its causal network, changes into a new system wherein the elements are related to each other by a new causal network with relative stability. Further, we would postulate that, while in certain systems the relationships among the elements may be, in terms of energy flow, self-contained and self-maintained and, as such, constitute closed systems, there may be other systems that are basically open, in which energy flow is such that their elements or subsystems are most often in unstable relationships, which may lead to a restructuring of the whole system. It is our opinion, and assumption, that cultural systems tend to be of this latter type, and, what is more, that most ecosystems, within which a cultural system must operate, tend to become open systems when they are interacting with a cultural system.

Our assumption that there are culture systems is obvious; beyond that we would define culture as patterned human behavior or activities that are based upon a complex of traditional beliefs and conventional understandings that to some degree are manifested in art and artifacts. Further, culture, as a system, would embrace a series of elements or subsystems directly or indirectly themselves related within a causal network. Although we hold no great brief for such a classification, we believe that, for archaeological convenience,

one might classify the various subsystems into three general groups.

On the most basic level, a series of subsystems are concerned with the adaptation of a population to its natural environment or ecosystem. This group includes the subsistence subsystem, the technological subsystem, the settlement pattern subsystem, the exchange subsystem, and others. While these subsystems or elements are related to the elements of the ecosystem in a complex causal network of interaction, they are also interacting with each other and with other subsystems at other levels of adaptation within the cultural system. They are extremely closely linked with the second group, a series of subsystems concerned with the interrelation and adaptation of individuals or groups of individuals to each other, i.e., the so-called social system, which can be conceptualized in terms of a sort of social energy flow chart. The social system embraces family and kinship, economic, political, rank and class, etc., subsystems which again share a causal network of relationships amongst themselves, as well as with the elements or subsystems of the primary ecosystem (the environmentally-adapted subsystems) and with the final group, the ethos system, sometimes referred to as a system of values, relating man or his activities to the cosmos. The various sets of traditional beliefs and conventional understandings prevalent in ancient times are examples of subsystems in this domain, and, again, they are related to each other, as well as to all the other previously mentioned subsystems. Thus, a cultural system is composed of a network of inter-related subsystems that in turn are related to the causal network of the elements of the ecosystem.

Further, since a cultural system is an open system, a significant change in one or more of the subsystems of either of the two more encompassing systems may change the relationships among all other subsystems, which may result in the formation of a new cultural system. In other words, significant changes in the subsystems may be the conditions that bring about the occurrence of various kinds of events, i. e., the changing of one system into another. It is our opinion that there are two sets of conditions that might cause such change. One includes conditions that trigger or stimulate the event, and these are often referred to as *sufficient conditions* or, less exactly, as *sufficient causes*. In archaeologically observed change, however, there may often be another set of conditions that allows these triggerings by sufficient conditions to occur, which in or of themselves would not cause one cultural system to change into another. Such conditions are often

called *necessary conditions* or *necessary causes*.

However, just being able to formulate in general terms the sufficient and necessary conditions, manifest in our archaeological record, which lead to changes within a culture, or the evolving of one cultural system into another, is not enough to make archaeology a science, for "generalized statements of such determining conditions [must serve] as explanations of the corresponding happenings." In simpler terms, this means that archaeology must not only be able to make general statements about why certain sufficient conditions, and perhaps also necessary conditions, have brought about changes in cultural systems, but it must also be able to test these general statements against other independent developments arising out of the same or a very similar set of conditions in another area and perhaps at another time. Here archaeology has problems, and the very nature of our data—past human activity and the results thereof—makes our "sciencing" take a rather different form from that of the well established "hard" sciences. While we may be able to collect our data by very exact methods like other sciences (although we usually don't), and analyze this organized data in such a manner so as to derive hypotheses to explain why things occurred (which we rarely attempt), we cannot set up experiments—"corresponding happenings" under controlled conditions—to test the validity of these hypotheses. Our data are old and dead and we cannot recreate them to see if the same processes would operate in the same manner that they did before. Thus, in our opinion, even the best scientific laws or generalizations about past human activities at which we can hope to arrive must be of a more probabilistic nature, rather than "exact" (mathematical) equations like those of our so-called "pure" sciences. Obviously, our methods of deriving generalizations must be very different.

As we alluded to in paragraph 1, Chapter 1 of Volume 1, the method for testing hypotheses about conditions that bring about events of various kinds must, in the archaeological realm, be a comparative one. Specifically, we felt that, if we had a complete sequence of cultural systems with their various interrelated subsystems (i.e., archaeological phases) in the Tehuacan Valley, and if we knew their relationships to their ecosystems as well as to other sequences of culture and ecosystems related to them in space (in Mesoamerica), we could analyze this data to derive hypotheses about the conditions (changing subsystems) that caused one phase (i.e., culture system) to evolve into another. Ideally, we hoped that then these hypoth-

eses about the changing subsystems that were correlated with the transitions from one Tehuacan phase to another could be tested against other well-analyzed long sequences from other areas or centers where the events of pristine civilization or the agricultural way of life had developed, such as the Near East, Far East and Peru, to see if they were valid and might be considered as scientific generalizations.

As shall be seen in Volume 6, we not only do not attain our ultimate goal of making valid generalizations about culture change, but we don't even test our tentative hypotheses with comparative data very well. In fact, our hypothesis about why one cultural system changed into another is not based upon a thorough analysis of sequences of cultural systems throughout Mesoamerica, but only upon an analysis of the Tehuacan material; and, even here, our knowledge of the ceramic phase is not very complete. Thus, the final three objectives on the higher level of abstraction—deriving hypotheses from an analysis of a complete cultural, historical integration, testing hypotheses by the comparative method, and generalizing about the process and ingredients of cultural changes—have yet to be done adequately for the Tehuacan Valley.

This is partly due to the fact that our endeavors on the lower level of abstraction have not been complete enough or phrased in such a way to allow us to pass on to this last part of our strategy. The ultimate objective of this lower level of abstraction, we believe, ideally, should be the establishment of archaeological sequences in terms of the fullest possible reconstruction of cultural systems along with their interrelated ecosystems (which include sequences of activities or cultural subsystems—the so-called "traditions"—within and through each of the larger systems), and that those sequences should be seen in the context of definite interaction spheres occurring within certain (various) horizons. This goal, to be considered in Volume 6, or at least the terms used in this statement of it, need further explanation.

First of all, let us consider what we mean by "horizon." A *horizon* has been defined as "a primarily spatial continuity represented by cultural traits and assemblages whose nature and mode of occurrence permit the assumption of a broad and rapid spread. The archaeological units linked by a horizon are thus assumed to be approximately contemporaneous" (Willey and Phillips, 1962). We would define it in a similar manner, but with a different emphasis that makes the concept more amenable to higher studies. To us, a *horizon* would be a time period in which approximate-

ly contemporaneous cultural systems are related in an interaction sphere.

Although we shall deal more extensively with the horizons that pertain to the Tehuacan Valley in Volume 6, we have alluded to them in our previous volumes (see Vol. 1, Chap. 1, p. 19). In the final chapter of the ceramic volume, we set up a series of horizons based upon horizon markers, overlapping pottery types, and trade material for the ceramic periods: Late Postclassic 1100–1500 A.D., Early Postclassic 700–1100 A.D., Late Classic 300–700 A.D., Early Classic 100 B.C.–300 A.D., Late Formative 500–100 B.C., Middle Formative 900–500 B.C., Early Formative 1500–900 B.C., and, based upon inference, horizons from 2300 to 1500 B.C. Also, although they were phrased in previous volumes in terms of culture “traditions,” we set up at least three horizons for the Pre-ceramic—one before 7000 B.C., one from 7000 to 5000 B.C., and one from 5000 to 2300 B.C. In light of new data, we would now probably divide the last into two horizons, one from 5000 to 3500 B.C. and the other from 3500 to 2300 B.C. We would also, in light of the very early discoveries in Tlapacoya and Valsequillo, now divide the earliest horizon into the periods between 10,000 and 7000 B.C. and before 10,000 B.C., with the full understanding that this earlier, non-finite one may be yet further delimited as more discoveries are made. Obviously, these horizons are extremely tentative, for we lack much data on the early horizons; we are using Carbon-14 time, not sidereal time, and we have established them in a very myopic manner, i.e., utilizing mainly Tehuacan data. However, the concept of horizons is extremely useful, not only because we can organize all our sequential data in some sort of coherent manner, but, more important, it allows us to discern the sort of interaction and exchange that occurred between the cultural systems of different regions or subspheres within particular horizons, whose analysis may allow us to set up hypotheses about why one cultural system or another changed.

Closely connected with this temporal integrative concept is a spatial one. Here we would prefer to use the concept of an *interaction sphere*, which has been developed over the past few years, instead of the older, culture area concept. We conceive of an interaction sphere as being a behaviorally delimited spatial unit within which recurring interstimulating interactions took place among cultural systems of the same horizons, in such a way that the cultural systems changed significantly. It is our opinion that this concept has none of the rigidity of the culture area concept with its implied cultural-environmental correla-

tions, and it seems much more amenable to analysis attempting to derive hypotheses about causality in cultural change. In our Tehuacan investigations we have not really grappled with the problem of defining the interaction spheres of each of the Mesoamerican or Tehuacan horizons, although Fig. 175 in Volume 2 represents a faltering step in this direction. In this volume, as well as in previous volumes, we have amassed considerable data pertinent to this problem of defining interaction spheres, but, as shall be seen in Volume 6, we cannot do this very successfully, for it is necessary to have a great mass of archaeological data from a wide area of Mexico and Central America, not just from a single valley like Tehuacan.

While it is necessary to define horizons and interaction spheres in our “cultural-historical integrations” in rendering hypotheses about cultural causality, it is crucial to define the traditions that occur within or run through our sequence of cultural systems in the Tehuacan region, as well as in related regions or subspheres. We would define *traditions* as being subsystems representing definite activities or energy flow complexes of either the cultural system or ecosystem that persist through a given period of time. In keeping with our systems theory approach, we would assume that those traditions or subsystems that change within the life span of a culture system, and change before some or all of the other subsystems, and thus lead to a new system are the sufficient conditions or causes for one system to evolve into another. Further, we have assumed that traditions existing within an earlier system or systems, without being integral parts of them, that become integral parts of the later systems, are necessary conditions for these later systems to come into being.

In the previous volumes we presented in considerable detail the raw data for establishing traditions, i.e., ecofacts and artifacts, in sequence, in Tehuacan. In those volumes, the emphasis of our study of the artifacts and ecofacts was on establishing time markers and sequences of definite time markers (often called modes and mode-clusters or types). Now, in this volume, emphasis is on those same artifacts and ecofacts as the concrete results of human and/or natural activities or behavior. Here we will study them contextually in an effort to determine what activity and cultural subsystem they were once part of, not only within the heuristic consideration of one moment in time in one spatial unit (or so-called “component,” as defined in Volume 1 on page 17), but also in terms of the data showing that these subsystems were persistent configurations through time and, as such, constituted tradi-

tions. This type of consideration is necessary before we can go on to the analysis of the sequence of traditions and cultural systems from which to derive hypotheses about the conditions, necessary and sufficient, that caused one cultural system to develop into another. The last step we shall attempt to do in Volume 6, but first the contextual data must be presented, which in turn are dependent upon our chronological studies, presented in the earlier four works.

Contextual Strategy

Clearly essential to the study of the cultural systems and subsystems, and to any attempt to derive hypotheses about why and in what way they change, is the very delineation or hypothetical construction of the cultural system itself. Initially, for chronological purposes, we defined our cultural phases as being "periods or segments of our sequence which have new complexes of types recurring in a number of sequential components," or components of roughly the same time period with the same complex of new types. Now, because of our strong contextual emphasis, we would give a rather different, but compatible, definition of "phase": a *cultural phase* comprises a cultural system that is composed of a series of cultural subsystems represented by clusters of specific kinds of artifacts, serving a whole range of activities, that took place at components (occupations) within a certain region (that space covered by a phase) and within a specific time period (preferably defined in years) while that specific assemblage (of chrono types) was in use. Obviously, this is a somewhat different definition of phase from that which is often used in reference to Mesoamerica, where phases are often defined on the basis of a few changing pottery types that may, but usually do not, represent different cultural systems. Such temporal units we would prefer to refer to as subphases rather than phases (and we must confess that down through the years we have not always been consistent in this matter).

Much of Volume 6 will be concerned with actual descriptions of our sequential cultural phases, or cultural systems, as well as with their interrelated ecosystems. Here in this volume we are mainly concerned with the new cultural contextual data and its interpretation, the basis for our descriptions in the proposed later interpretive volume. In a study of contextual data that leads to the defining of cultural systems and subsystems, there seemed to us to be, ideally, a definite set of tactics that might or should be employed. First of all, each individual feature, artifact, fragment of debitage, and ecofact, in its exact temporal-spatial,

contextual position was considered the result of human behavior or activity, either an implement or a product that was used there and then. For the most part, our interpretation of what kind of human activity the resultant artifact was involved in was based upon ethnographic analogy. (Even in our first three volumes, which were basically concerned with chronology, we almost unconsciously made assumptions, based on analogy, about the use and manufacture of certain artifacts and ecofacts.) Only rarely have we tested our hypotheses, so derived, about the use and manufacture of features, artifacts, and ecofacts, either by making modern studies of wear patterns or from modern manufacturing processes. The junior author and the late Dr. Callen did examine microscopically the scratch and wear on seeds, as well as on grinding tools, and compared them with those of modern tools and modern seeds which were made by either known or experimental methods. Also, the senior author discussed the evidences of flint working on the cores and chips or flakes with Don Crabtree who could duplicate them by various flint-knapping practices. The too brief section on flint-knapping techniques in Chapter 6 of Volume 2 is an interpretation based mainly on this sort of experimental analogy rather than on ethnographic analogy. Generally speaking, however, we did far too little of this type of study, and a fuller employment of Seminov-like techniques would have much improved our interpretations of artifact and ecofact use and manufacture, as well as tested our interpretations based upon ethnographic analogy.

This procedure, however, was only the first step in the tactics of contextual studies, and we employed another technique that, at least to a certain extent, could test some of our interpretations based on ethnographic and experimental analogy—this was our study of activity areas wherein spatial clusters of artifacts and/or ecofacts within a particular floor or zone are associated with ecofacts indicating a particular season or seasons of the year. We have assumed that such spatially non-random clusters of artifacts and ecofacts that are of the same discrete temporal period indicate that they were probably involved together in a specific activity or set of activities. In some cases the associated tools were literally part of a specific tool kit. Here was a means of determining the activities of a cultural subsystem at one period in time at one place. In the sections concerned with the way of life of various zones, we shall be making many interpretations of many such activities in many such activity areas, and, although the interpretations themselves may leave much to be desired, the technique is certainly a valid one for inter-

preting ancient activities in ancient cultural subsystems. Again, ethnographic analogy and experimental analogy assist with such interpretations.

A third step was to relate the activity areas of particular occupations to each other and to derive the cultural subsystems which were operating within a cultural system (or part of a cultural system) at a certain time in a specific spatial unit. Here, again, we compared the seasonality factors from the various activity areas and made the assumption that different activity areas of the same layer, floor, or zone, with evidence of having been occupied during the same season or seasons not only were probably related, but the activities of the various areas probably also made up cultural subsystems of the same cultural system of a particular group at a specific period of time. Our descriptions of the way of life of the occupants of specific zones in various excavated sites in this volume will be operating on exactly this level of interpretation. It might be added that, with respect to our survey sites, our interpretations as to population size and function of settlements, or settlement pattern types, of the various sites also operate on this level, but, in these cases, they are on a much shakier foundation, for we did not have the sort of fine chronological data to indicate that the various sections of the sites were in fact contemporaneous; nor did we have artifact clusters to indicate specific activities, though, of course, we did have artifact assemblages for whole sites which did hint at specific activities.

The final step in our contextual studies was much like the third, but it concerns relating the occupation of components, with their cultural subsystems, to each other to form phases, or relatively complete cultural systems. Included in these comparisons are, not only the various excavated components, but also the surveyed sites, which illuminated the settlement pattern and community pattern aspect of the cultural phases. Here, again, the assumption was made that a series of sites or occupations that were roughly contemporaneous and had very similar cultural subsystems (i.e., artifact and ecofact complexes) probably belonged to the same cultural system.

The actual descriptions of the sequential cultural systems and their interrelated ecosystem will appear in Volume 6, but much of the basic data upon which they will be built are in this volume. This is not to say that data pertinent to reconstructing the sustenance, subsistence, and food preparation cultural subsystems did not appear in Volume 1, or that many aspects pertaining to various technological subsystems did not appear in Volumes 2, 3, and 4, but rather that this

data, as well as additional data, will be presented here more precisely in contextual terms.

As should be obvious from the above discussion of our own contextual studies, none of this could have been attempted in a very convincing manner without a well-established chronology. We had to know not only that certain activity areas were contemporaneous in terms of seasons, but also that various components, either "pure" or "probable" or "possible" (impure), were contemporaneous in terms of rather exact time periods. Our first four volumes are much concerned with this description of our chronology, and there seems little point in reiterating what we have done or should have done here. While there are certain aspects of our chronological studies that are or could be much improved, we feel that we pushed that data we did collect about as far as it could go, and any major improvement could only come from more data collection.

Data collecting and recording, of course, is the first objective of our overall strategy. Much has been written in Volume 1 about our collection of ecological and environmental data by the interdisciplinary method, while Volume 4, as well as Volumes 2 and 3, contained some discussion of our procedures for collecting and recording data for chronological studies. There have also been, throughout the previous volumes, statements about our collecting and recording of contextual data; in this volume, however, in our descriptions of the excavations, we shall go into more detail concerning our archaeological digging techniques. Perhaps these should have been described earlier, but they are so closely connected with the cultural contexts to be described here that we felt this volume was really the appropriate place for them to be. Here also, in a later chapter, we shall give a description of our surveyed sites and our techniques of survey.

Thus, with reference to the overall strategy of our Tehuacan investigation, we perceive it as moving through an ideal set of sequential steps: first, data collection, then, description of chronology, to be followed by description of cultural contexts using terms that would facilitate the next objective, the making of cultural-historical integrations. After these objectives are attained, we feel one might move on to a higher level of abstraction at which, ideally, one could derive hypotheses about cultural changes from analysis of the cultural-historical integrations, then test these hypotheses by the comparative methods in the hope of reaching a final goal—the framing of scientific generalizations about cultural processes and change. This volume is concerned mainly with the third step in our ladder of objectives, the descriptions of cultural con-

texts. It is a key step, for without this kind of data one could not proceed to any higher or more abstract objective. From many standpoints, these contextual data are the nitty-gritty of all our investigations.

Now, having presented the theoretical basis of our investigation in its concepts and overall strategy, and its bearing on Volume 5, we shall briefly discuss exactly what we did in preparing this data for publication before we get to the descriptions and interpretations in succeeding chapters.

The Accomplishment of Volume 5

To say exactly when we began our contextual studies is difficult if not impossible. Certainly provisions for doing such were part of the original game plan outlined in our first proposal to the National Science Foundation, drafted in 1960. During the senior author's early work in the Sierra de Tamaulipas in 1952, attempts were made to estimate sustenance and subsistence; and, in 1954, working in the Sierra Madre de Tamaulipas, excavations in Romero's Cave gave striking evidence of activity areas. Both of us had a long-time interest in interpreting artifacts as to their manufacturing techniques, particularly the junior author with her fine training in France. Certainly Mike Fowler and the senior author, in our 1961 excavations in Coxcatlan Cave, were well aware of the presence of activity areas and the possibilities of making contextual studies about the way of life on each zone.

Perhaps one way of assigning a date for the beginning of contextual studies resulting in this volume is to refer to the time when a contextual study in San Marcos Cave produced a manuscript which eventually became part of this volume. This occurred in late 1962 and early 1963 when Drs. Mangelsdorf and Galinat began to study corn and were very much involved with the maize sequence from San Marcos Cave in particular. Prior to this, much of Flannery's identification of faunal remains had been undertaken, preliminary studies of the flora and coprolites had been made by C. Earle Smith and Eric Callen respectively, and F. Johnson had obtained three C-14 dates for the earliest zones in San Marcos Cave. Since we were involved in taking out the numerous corn remains from San Marcos Cave for study by our specialists, we decided we might just as well take out all the excavated materials, which were not overly numerous, segregate them by occupation level, and then study every artifact and ecofact by zone to see what activities could be determined for each of its six occupations. By early 1963, Mary Hill Gilbert had typed the manuscript resulting from our study. It had a very definite format; a brief

introduction on the geography and local environment, our excavation techniques, and the stratigraphic sequence of the cave, along with a chronology chart. Then, following this, separate sections covered the way of life on each zone, including a description of the strata, indications of seasonality and of size of occupation, estimates of sustenance of the inhabitants, their subsistence and food preparation activities including the evidence of the tools of the trade, then an interpretation of their technological activities and possible social activities, and finally, a paragraph classifying the occupation and giving the C-14 dates of it. This was considered a model for the sort of chapters that might appear in a hoped-for volume in our hypothetical series on Tehuacan prehistory, so it was passed around to our potential authors of site reports—Fred Peterson, Mike Fowler, Angel Garcia Cook, Kent Flannery, and others—for criticism and as a guide for their possible reports. Although most of our site reports in this volume vary considerably, it is rather remarkable how closely they adhere to the original format we developed for the description of San Marcos Cave.

A number of other endeavors indirectly pertaining to the preparation of this volume were undertaken in 1963, but the next one to yield actual manuscript material came in the fall of that year. During the summer, Dr. C. Earle Smith and the late Dr. Eric Callen finished their respective studies, and the authors took their data, as well as data derived from Dr. Kent Flannery's study of the zoological remains, and began a study of sustenance and diet of the inhabitants of the many floors and zones of our caves. This yielded not only a picture of the trends in sustenance through time, but also contextual data pertaining to the diets of the inhabitants of particular zones or floors at any one moment or period in time. Later, the sustenance data (derived from animal bones, plant remains, and human feces) analyzed in conjunction with studies of certain artifacts and archaeological features, enabled us to make estimates of subsistence and food preparation activities. The manuscript resulting from these studies became, in 1964, the basis for the final, summary chapter in Volume 1 on Environment and Subsistence, published in 1966. Later, much of this made up the data on sustenance, subsistence, and food preparation included in our way-of-life interpretations on various zones of various excavated sites, in manuscript for this volume. Unlike the earlier chronological orientation, here the definite contextual orientation, used to describe cultural subsystems of ancient systems, portends, we hope, a slightly more sophisticated use of the data.

A subsequent study utilizing the information gained from our archaeological reconnaissance was basically concerned with population, settlements, settlement and community patterns, and the social implications thereof. It began perhaps as early as the other study mentioned above but dragged on for a number of years. A description by Peterson and the senior author of the general area, their initial survey, the major survey done by Peterson, Molina, and the Tejeda brothers as well as Neely's resurveying and mapping, and the interdisciplinary studies of seasonality, all will be found in the first part of the chapter on the archaeological reconnaissance. In addition to these efforts, we classified the non-ceramic artifacts from the survey sites. The ceramics were classified by the senior author, Ann Harvey, the Tejeda brothers, and by a number of archaeological students from the University of Calgary. During the mid-sixties, James A. Neely corresponded with the senior author regularly on the subject of site descriptions and correlations of settlement features. Finally, by 1967, we had a huge pile of manuscript, mainly in the form of site descriptions; from this, the sites were arranged by cultural phase, or subphase, and introductions containing statements about the settlement pattern and related matters were prepared for each. We might add that, accompanying these many pages of manuscript, there was a whole series of site maps of varying degrees of accuracy and some huge charts correlating sites and various kinds of settlement pattern features. A number of short articles written by the senior author summarizing some of this information appeared in print after this date.

At about this time, studies were being made of the various non-ceramic artifacts—their use and manufacturing techniques. While we were still engaged in field investigations in Tehuacan, Irmgard Johnson was studying the textiles and their manufacture and use, resulting in her excellent article, which appeared in Volume 2. During the time we spent classifying the non-ceramic artifacts for chronological purposes, the junior author, somewhat because of her French academic background, showed great interest in their use and manufacture. Often this brought loud cries of protest from the senior author who was pressing to get the chronological studies done; but, in spite of our various arguments, notes were kept, and, eventually, some of them were utilized in the contextual studies in this volume. Also, following the field endeavors in Tehuacan, Miss Nelken undertook a major study of our ground stone artifacts to determine their use and function. This resulted in her thesis paper, a study which we feel has never been given the recognition it de-

serves. Some of the conclusions of her thesis have also been incorporated into chapters of this volume. The final part of these endeavors was a study by the authors of the cores, chips, flakes, and other debitage from all the floors to increase our understanding of ancient knapping techniques. These data have been included in various parts of this volume. Generally speaking, we feel that far too little of this sort of study was done in our initial Tehuacan endeavors, and, in hindsight, we also feel that many of our contextual interpretations in this volume would have been greatly enhanced by this type of study, particularly using the Seminov micro-photography techniques and experimental technological techniques. However, we did the best we could at the time, and the basic archaeological material is still around for further study by more sophisticated and comprehensive techniques.

The last of the preliminary preparation for this volume involved the site reports themselves, and these dribbled in over a ten-year period. Perhaps the first attempt in this direction, after our original San Marcos model, was Kent Flannery's doctoral dissertation, which was concerned with problems of the Formative as seen from materials from the Canoas site. Much of the ceramic analysis from his thesis was incorporated in Volume 3, and only the description of the excavation techniques is included in this volume. The interpretations of the way of life in each occupation at Canoas were not written until the early 1970's when they were combined with the reports on the Ajalpan, Coatepec, and Quauhilco sites, also written at that time (Chapter 5), all of which had very different kinds of illustrative materials. The other excavation from San Marcos Canyon, Tecorral Cave, and other tests in the Travertine Slopes were written up about the same time that Kent's thesis appeared, so that the basic contents of Chapter 4 were early in completion.

The next manuscript to appear was Mike Fowler's on Coxcatlan Cave, in the mid-sixties. It was a very complete job with numerous illustrations, including many hand-drawn floor plots (which our editor of that day protested could not be printed), profile drawings and photographs, and many tables. Some of the way-of-life descriptions of the zones did not conform very closely to our San Marcos model; and, due to an incomplete job of analysis, some artifacts, most of the debitage, all the ceramics, and most of the perishable artifacts had not been considered in his zone descriptions. Mike and the senior author later spent a very pleasant week in Milwaukee resolving these problems, and Chapter 6 is largely the result of those efforts. Later, the reports on other nearby sites were added to

INTRODUCTION

these materials. The final site reports to be written were those of sites in the El Riego and Leneho Diego localities. These were written in the late sixties and early seventies while the authors and Angel Garcia Cook were undertaking investigation in highland Peru. The illustrations for these also were done in a manner completely different from those of Coxcatlan Cave, San Marcos Cave, and the open sites.

All in all, by the end of 1970, we had drafts of most of the basic material for this volume. A stack of manuscript over a foot high included numerous tables of various sorts and sizes and a mass of illustrations of a multitude of styles and shapes. Then came the task of putting it all together in book form, and, thanks to a generous grant from the National Science Foundation, we have been able to do just that. Almost at the outset, our editor, Diana Gibney, and the senior author decided that the volume was composed basically of two parts, the reconnaissance and the excavated sites, and that these should be handled somewhat separately. Also, since the survey material gave most of the settlement pattern data, included in the site reports, we decided that survey should follow the chapters on excavations, even though the reverse had been true in the field operations.

The first part of the book on the excavations is arranged in terms of the five micro-environments; thus, Chapter 2 concerns our excavations in the El Riego Oasis locale, Chapter 4 covers our excavations in the Travertine Slopes Zone, and Chapter 5, the excavations in the Valley Center sub-area. Chapter 3 describes the excavations in the Leneho Diego locality of the Canyons and Dissected Alluvial Slopes micro-environment, and Chapter 6 is about the excavations in the Coxcatlan locality within the Alluvial Slopes zone. (See Fig. 2 for site and test locations with respect to their various micro-environments.) We also decided that each chapter heading would be accompanied by a photograph illustrating what the micro-environment looks like.

Generally speaking, the format of the chapters adheres closely to that of our initial model for San Marcos Cave. The first part of each chapter is concerned with a brief synopsis of the ecology and geography of the micro-environment, and is, in large part, taken from Volume 1 of our series. This stands literally as the ecological context of each of the excavated occupations within the micro-environment and is usually followed by some explanation of our excavation process, taken from our field notes, and concluded by a statement on the chronology within the micro-environment, determined by our stratigraphic excavation and chronometric dating. This information is mainly taken from

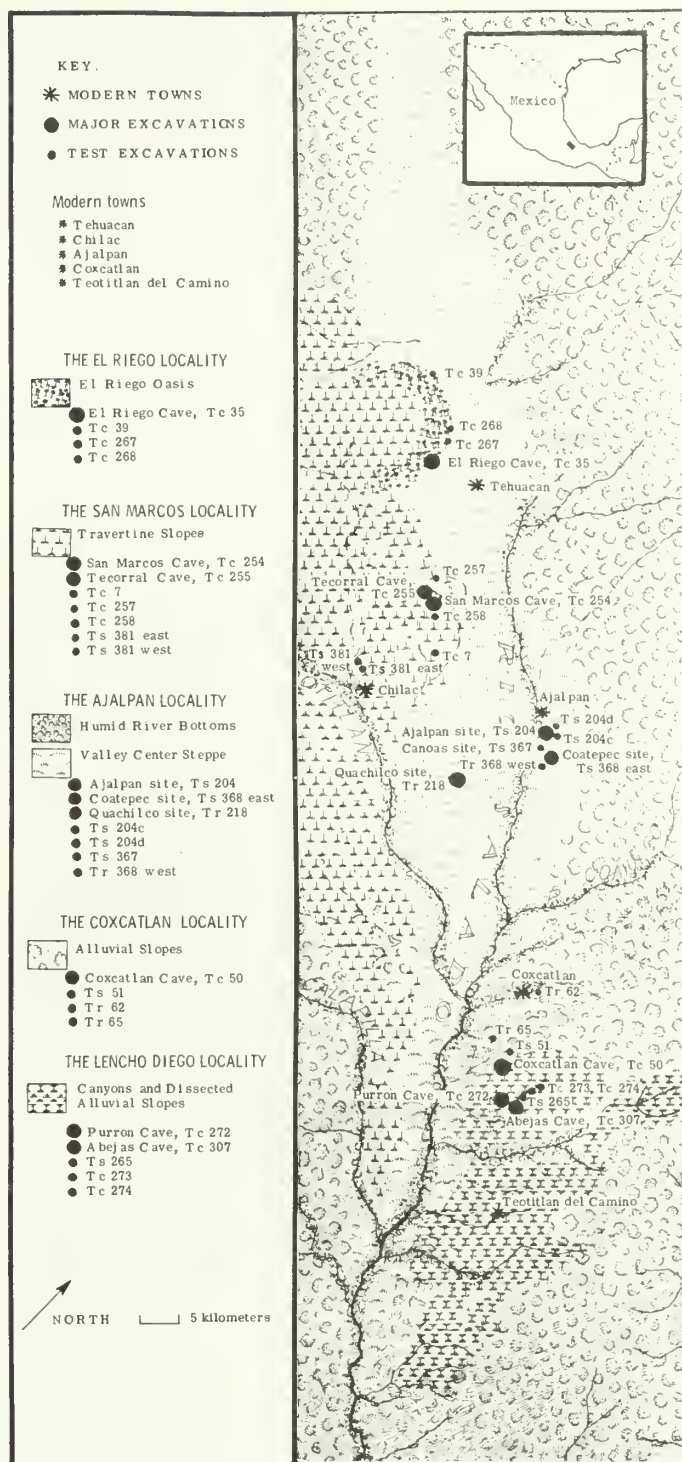


Fig. 2. The Tehuacan Valley, showing principal towns, major excavated sites, and tests in the ecozones.

Volume 4. Following this introductory material are the site reports and brief descriptions of our test excavations, and then a brief summary. The site reports are very close to our San Marcos model: first, a brief description of the locale and the area of excavation itself; then, some details of our excavations; and, finally, a bit about the chronology of the site. Then follows the zone-by-zone descriptions and interpretations of the way of life of each in chronological order very much after that of our San Marcos model. In our written descriptions and interpretations of the various occupations we have tried to consider every ecofact and artifact uncovered, and we further attempted to give illustrative material that would not only supplement the verbal descriptions and interpretations, but also record every artifact and ecofact in its contextual position for most occupations—the raw data for any such contextual interpretation.

Devising this type of illustration was a major problem during the writing of the many preliminary reports. For the San Marcos and Valley Center reports, we had typed in the ecofacts and artifacts and their numbers in each square for each zone on the floor plan maps. This was a cumbersome process and the large size of the typing often resulted in obscuring activity areas rather than emphasizing them. Mike Fowler in his Coxcatlan report had a series of maps for each floor with zip-a-tone or symbols illustrating each general class of artifact and ecofact, but it was a great quantity of maps to publish and did not reveal the exact position of any particular artifact or ecofact type. In our Purron Cave report we had attempted to draw in each artifact in its correct position on the floor plan of each zone, and key the artifact with a number or letter in the legend that told what type each one was. This showed well our artifact clusters, or activity areas, but it took endless time and was very costly. Then, in Peru, in 1970, we were most fortunate in having with us a student assistant from the University of New Mexico, Robert Vierra, who had considerable computer expertise, for he turned up the best solution to illustration problems we have yet seen. He proposed we utilize a Cal. Comp. line printer that could draw symbols with numbers on a grid system comparable to our gridded-out excavated sites. We then turned to our first three volumes and assigned a symbol to each general class of artifact and ecofact types: triangles for projectile points, pentagons for bifaces, squares for end-scrapers, vertical rectangles for blades, horizontal rectangles for side-scrapers, diamonds for ground stone, stars for bone tools, asterisks for string, steps for knots, crosses for vegetal tools, bathroom plugs for

textiles, 1's for vegetal types, stepped pyramids for bones, H's for hearths, zeros for bone fragments, C's for ceramic sherds, hexagons for cores, and F's for flakes. Then we went through the tables in our early volumes and assigned a sequential number to each artifact type, plant specie, or faunal part. For example, triangle 2 was a Lerma point, our earliest type, and triangle 3 was an Abasolo point, our second earliest type, and so on. Then we filled out IBM sheets giving the class (i.e., the symbol), the number of the type in the class, the number of examples of the types of that class, the location of the object or objects in the grid system, the floor or zone, and the site number. These sheets were then given to a punch-card operator who punched out IBM cards and these were then fed into the machine. What came out were long sheets with maps of the artifacts and ecofacts correctly plotted in terms of the symbol, number, and frequency of occurrence. It might be added that the computer had a sort of personality of its own, for, if it was fed the exact location of an artifact or ecofact, then it printed it in that position, but if it was given only the square location, then it printed diagonally across the square. Also, occasionally, the printer left out a symbol if two were too close to each other. This, the employment of three or four different students filling out IBM cards, the various punch-card operators, and some artifacts, which did not have exact locations in catalogue or had wrong zone assignment, meant that our floor plots and the tables of Volumes 1, 2, and 3 are not exactly in agreement. However, checking revealed that the discrepancies were so minor that they affected neither our chronological nor our contextual interpretations significantly.

The final effort was to turn these Cal. Comp. line plots of the various floors or zones into illustrations for this volume, and this was accomplished by Miss Julia Seton, assisted by the senior author in Andover, Mass. Here the grids for our maps were drawn on the printouts, the areas of excavations outlined, and such locational items as the back walls of caves added. Also, other features of the occupations—pits, burials, hearths—were drawn on the printouts. Next, the activity areas were further emphasized by the use of zip-a-tone, and finally the legend was made. This latter operation was not only time-consuming but highly interpretive as well. In the legends we attempted to identify the symbols of the various activity areas and group them in terms of probable activities. As shall be seen, these illustrations are unique in archaeological contextual reports, and we believe they greatly supplement our written interpretations, as well as present a

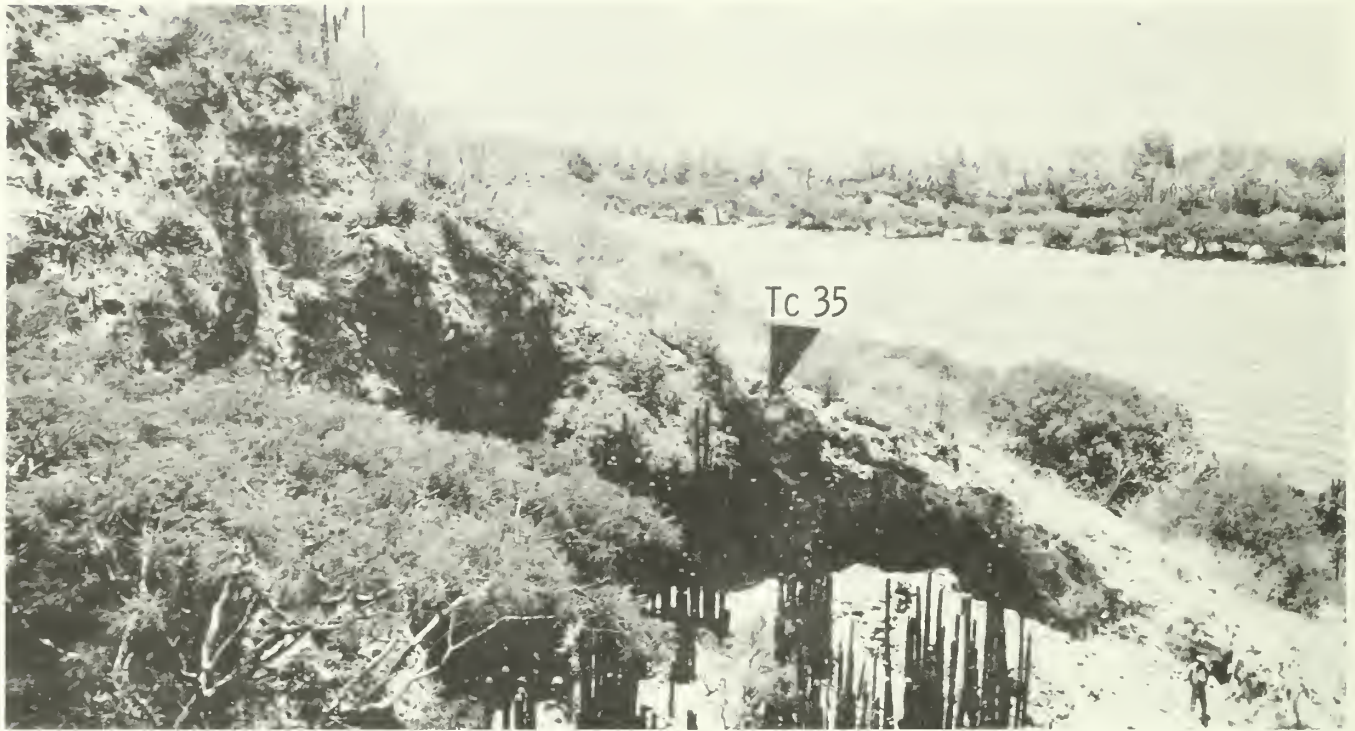
host of basic contextual data. In fact, a colleague facetiously suggested we "publish the illustrations and forget the damned book."

The other illustrations are of the usual sort, cross-sections and contour maps with zip-a-tone and legends for various excavations, commonly occurring in most site reports. There are also some photographs of sites and digging techniques, and of some features.

Chapter 7, entitled "The Archaeological Reconnaissance of the Tehuacan Valley," is published in an entirely different manner and presented an entirely different set of problems in its preparation. Following an introductory section on our general procedure in the settlement pattern study, and a number of tables summarizing the data, we have arranged a series of sections in terms of our chronological phases or sub-phases. Each has two parts. The first parts of these sections are basically interpretations and summaries of the settlement pattern data for each phase or sub-phase. The section head is supplemented by a bird's-eye view of the reconstructed settlement pattern in the Tehuacan Valley for each of these periods and, on the following page, there are two maps for the relevant period, one of the ecological zones with site numbers for each site, and the other a topographic map with symbols showing the various kinds of settlement types of that period and the communities outlined. These first parts were less of a problem for our editor than the second parts, made up of the site descriptions, for

their original manuscripts were extremely long, boring, and repetitious. The task at hand was to cut them down without losing any of the basic archaeological information. We have accomplished this by placing much of the information in a series of accompanying tables and leaving only the barest settlement pattern and locational data in the texts. Further, in the larger sections that concern ceramic period sites, we have included isometric site maps showing more or less a range of settlement pattern types. These exquisite drawings by Sally Landry, we feel, give a better feeling for the internal site arrangement than any words could ever accomplish. In fact, as our facetious colleague remarked, the sites "look better now than they did when the Indians lived in them."

The final brief chapter of the book is a sort of summary of what we found. All in all, this volume represents a unique attempt at undertaking contextual studies. We hope we have presented much contextual data that may be of use to future archaeological endeavors. In the course of this study we have learned a great deal about theory, method, and techniques, and hope this will also be useful to other investigators. We feel our attempts in this realm have been far from perfect, but we hope that future archaeologists will profit by our mistakes. If any of the information is useful, and if any of our hopes are accomplished, then we shall feel that all these months and years of blood, sweat, and tears will have been worthwhile.



CHAPTER 2

Excavations in the Locality of the El Riego Oasis

Richard S. MacNeish and Angel Garcia Cook

THE EL RIEGO OASIS, a lush crescent of land in the northwest section of the valley, was one of the first areas visited by MacNeish in the spring of 1959 before the Tehuacan Project got underway. He was accompanied by William Edwards, then of the Dept. of Northern Affairs for the Canadian government. At that time, and in the following year, MacNeish, climbing in and out of several small rock shelters in the El Riego cliffs, explored that area and the area along the Tehuacan-Puebla highway. Formal survey, however, was not initiated until Feb. 8-12, 1961 when MacNeish and Fred Peterson, now of West Virginia Wesleyan University, found and recorded caves Tc 29-Te 39. Survey was completed by Peterson Dec. 27-29, 1962 and additional sites 263-270 were

recorded. Excavation began on Feb. 12, 1961. MacNeish dug a 1-meter test square in the eastern part of El Riego Cave, a site which proved to be most rewarding; major excavation by MacNeish and Angel Garcia Cook took place during the hot days between April 24 and May 29, 1961. Later, MacNeish tested caves Tc 266, Tc 267, and Tc 268 and dug trenches in Tc 34 and Tc 39 in hopes of finding well-preserved remains equal to what by then was turning up in El Riego Cave.

The Oasis, located about 2 kilometers directly west of the town of Tehuacan (97° 25' to 30' latitude and 18° 25' to 30' longitude), takes the form of a 180° crescent. Its small shape, about eleven kilometers long and never exceeding one kilometer in width, extends

from the edge of the plateau of the Cerro de las Mesas at an elevation of about 1,700 meters above sea level down the El Riego cliffs and out onto the adjacent flats at elevations of 1,660 to 1,620 meters. The cliffs range from less than 5 meters to as high as 40 meters and the talus in front of the cliffs ranges from more than 10 meters to almost 50 meters. The Cerro de las Mesas is composed of stratified beds of travertine and limestone, called the Cerro de las Mesas Formation, apparently formed in the Cenozoic or Quaternary Period. Out of the eroded cliffs have flowed waters which have deposited a thick unstratified travertine encrustation. This encrusted travertine is unbedded, and varies in thickness. Within it are a series of crevices, tunnels, overflows, and rock shelters. Because of the springs and waterflow out of and out from under the El Riego cliffs we can see a distinct transition between the more desolate limestone-travertine slope zone to the west and the valley center zone to the east.

Jean Brunet has discussed the falling water table and springs in Volume 1. This waterflow has resulted in a lush vegetation even though the Oasis is in a part of the valley that receives less than 500 millimeters of rainfall a year. (Most of this rainfall occurs in two brief periods, May-June, and September-October.) It is an extremely hot area as well, ranging from about one degree above centigrade in the coldest parts of the winter months to as high as 38 or 40 degrees above centigrade in the hot summer wet season. Obviously it is the permanent supply of spring water that is such an important factor contributing to the lushness of the micro-environment where the year-round verdant vegetation stands out in sharp contrast to that of the rest of the valley, fluctuating from a stark brown in the dry season to a flowering green in the brief wet season. In its well-watered alluvial soils grow mesquite, guaje, tule, ciruela, and other fruit trees, as well as prickly pear cactus, *Agave*, and organ cactus, along with dense patches of weeds and grasses. Even without agriculture, it would have provided some foods in every season of the year: *Agave* leaves and cactus fruits in the winter, grass and amaranth seeds and mesquite beans in addition in the spring, fruits and seed foods in the summer wet season, and ciruela, chupandilla, cosahuico, and other fruits in the fall. Agriculture, as well as fruit tree horticulture or orchard culture made possible by the spring water, would yield foods during all seasons. As might be expected, a wide variety of animal life is available to the hunter and collector: deer, peccary, skunk, raccoon, gray fox, gopher, rabbit, opossum, snake, lizard, and many varieties of rats,

mice, birds, and insects abound. While some or all of these animals inhabit the Oasis all year round, there is an especially great concentration of them in the dry season when little water is available in the surrounding micro-environments. There are no plants or animals in the El Riego Oasis that are peculiar to the zone, but the congeries of flora and fauna there is not duplicated elsewhere, and, furthermore, is concentrated in a very small area. Perhaps the greatest limitation of the region in regard to foodstuffs is its small size, and without agriculture it would never have provided large amounts of food for large groups for very long periods.

Still, the small concentrations of human remains associated with the plant and animal refuse and extending over a 10,000-year period attest to the fact that it was always a good place to live. This becomes apparent as we consider life at various periods through time in El Riego Cave.

El Riego Cave

One kilometer directly west of the El Riego Hotel, a small east-west canyon about 150 meters long and about 20 meters wide cuts through the El Riego cliffs. On the north side of this canyon about 10 meters south of the highest of the El Riego cliffs, at the foot of the cliffs and about 15 meters above the floor of the small canyon, a cave, or perhaps we should say two small inter-connected rock shelters (Tc 35 east and Tc 35 west), is barely visible.

The larger of these shelters, Tc 35e, is oriented north-west south-east, and is about 15 meters long, with a maximum depth of about 7 meters. Two huge columns of rock each about 3 meters in diameter divide the east shelter into two unequal areas, and only that area northwest of these rock columns, about 9 meters long and containing human refuse, could be excavated (Fig. 4). The other rock shelter, Tc 35w, was much smaller, and much of its roof had apparently fallen in. Its northwest end meets the north end of Tc 35e at a right angle. This shelter was also about 9 meters long and, including some crevices and niches in the back wall, had a maximum depth or overhang of only about 3 meters. Excavation of some huge rock slabs in front of the shelter indicated that at one time the overhang probably extended as much as 6 meters.

The initial 1-meter square dug by MacNeish on Feb. 12, 1961 became Square N3 in the east niche. Although this was dug largely in arbitrary 20-centimeter levels, the materials correlated with six stratigraphic zones (Fig. 6). The refuse was about a meter thick and the preservation in most strata was good. It seemed to be worthy of major effort and on April 24, 1961 Angel

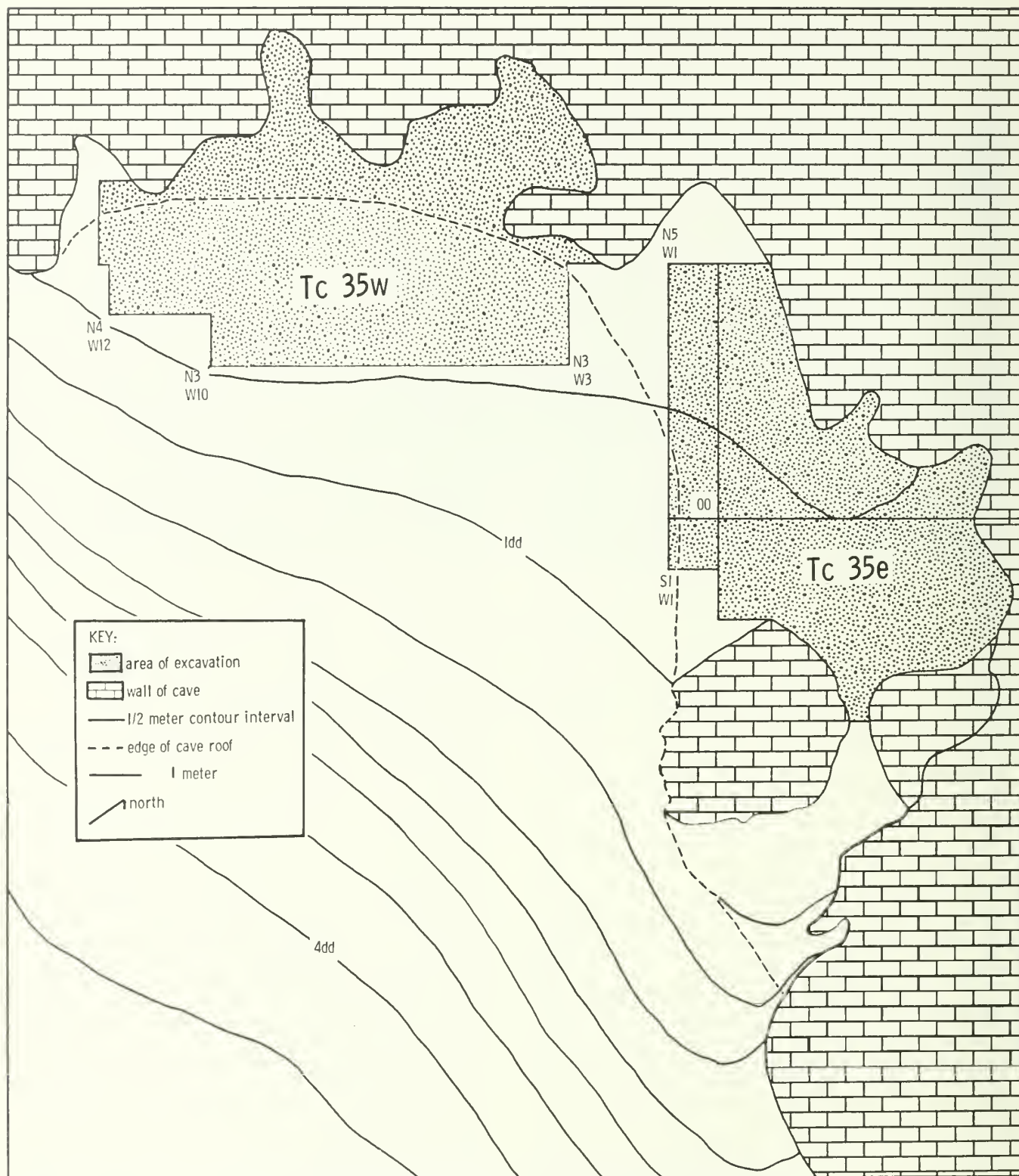


Fig. 4. Contour map of El Riego Cave, showing areas of excavation.

Garcia Cook and MacNeish returned to undertake excavation. As was our custom, we staked out the caves in 1-meter squares, took depths, and made a contour map of the elevations of the two caves. We also took a series of photographs. In the east cave, squares ran from about the S4 profile to the N5 profile, and from W1 to E6. In the west cave squares ran from N3 to N9 and from W3 to W12. As excavation began in Tc 35e we moved from Test Square N3 into the next square south, N2, stripping off by trowel the horizontal strata as seen in the vertical profile on the south wall of N3. We continued this type of digging into N1 and then turned northward into N4, thereby completing a 4-meter-long, 1-meter-wide north-south trench. When the east-west walls of each square had been drawn we then drew the 4-meter-long profile. The west wall (W1 axis) was almost entirely in rock, but the east wall of this profile (the 0 axis) showed beautifully clear stratigraphy. We named the strata Zones A through F, drew the profiles, and photographed the long wall at the 0 axis (Figs. 6, 7). After some discussion of excavation tactics we decided a west-east trench at a right angle to the first one was needed, so we dug Square S1E2, trying to peel off the zones from above, and then went into Squares S1E1, S1, and S1E3 using the technique of stripping horizontal strata from a vertical profile. We made out long sheets of millimeter graph paper for each grid axis line and, as the walls of each square were finished, the profile of each wall was drawn on the appropriate sheet. We next connected the two trenches by digging Squares 0-0 and S1 and extending the west-east trench east into Squares S1E4, S1E5, and S1E6. We then had two trenches at right angles to each other, a north-south trench six meters long at the edge of the shelter and another extending into the cave six meters from its south end. Individual square wall profile drawings were again checked against the long profile walls and the walls were photographed. From the walls of these two trenches we could control the stripping of actual individual strata in the undug squares and could discern and excavate the archaeological features.

Other records were kept. A daily diary recorded who dug what square and when, the relationship of the strata of the squares, the general digging techniques, and other thoughts concerning interpretation of materials being exhumed. Supplementing square description sheets included the soil type of each stratum, the depth of each and the level, the location of the artifacts or features in each level, the date each was excavated, and the excavator. There were also sheets for each feature, one for each burial and one for each



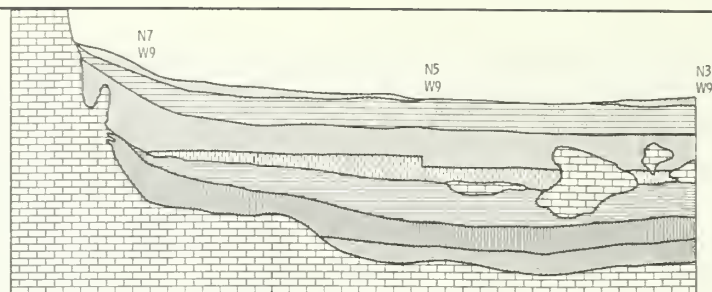
Fig. 5. El Riego Cave in the cliff of the El Riego Oasis, as seen from the south.

Carbon-14 specimen. Finally, each bag of artifacts was labeled as to square, level, stratum, and kind of artifact. This process eventually became the basis for cataloging the materials.

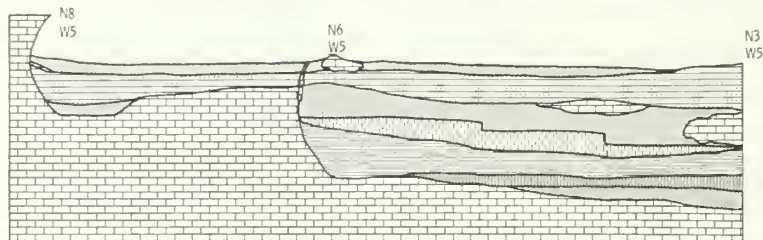
Using these techniques of excavation and recording, we set about excavating all the rest of El Riego east. We moved our north-south trench eastward by digging alternate Squares N4E1, N2E1, and E1, and then took out the in-between squares, N3E1 and N1E1. This gave us a new profile at E1 to study and photograph. Next we extended our west-east trench southward, removing Squares S2E4, S2E2, S2E1, S2E3, S2E5, and then even further southward into S3E2, S3E3, S3E4, and S3E5. We then took out a strip in the northwest part of the cave by removing the E2, E3, E4, and E5 squares by the previously mentioned system.

NORTH-SOUTH PROFILES

North-South W9 Profile

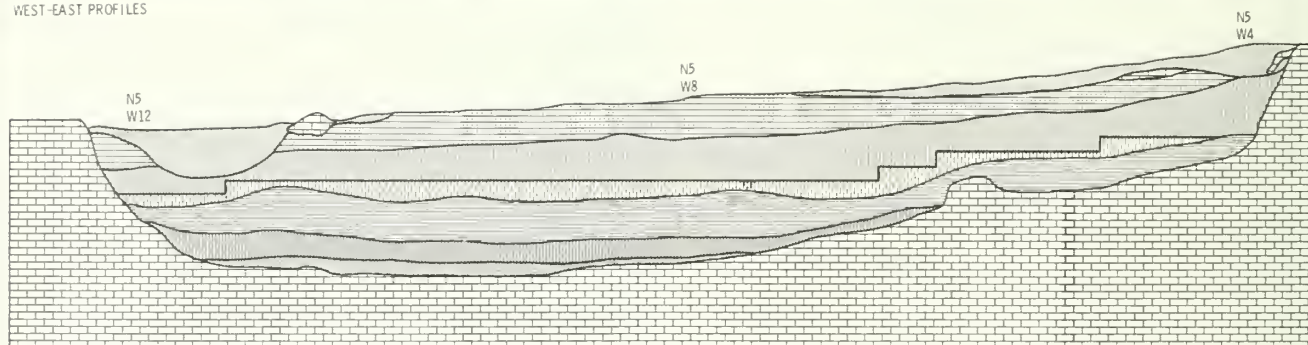


North-South W5 Profile



WEST-EAST PROFILES

West-East N5 Profile



West-East N3 Profile

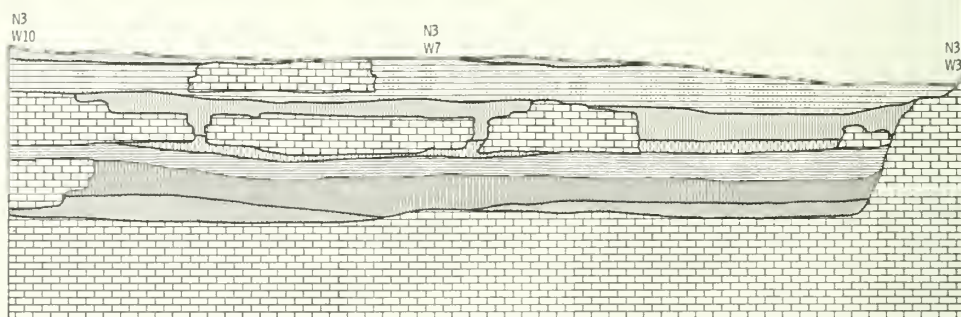
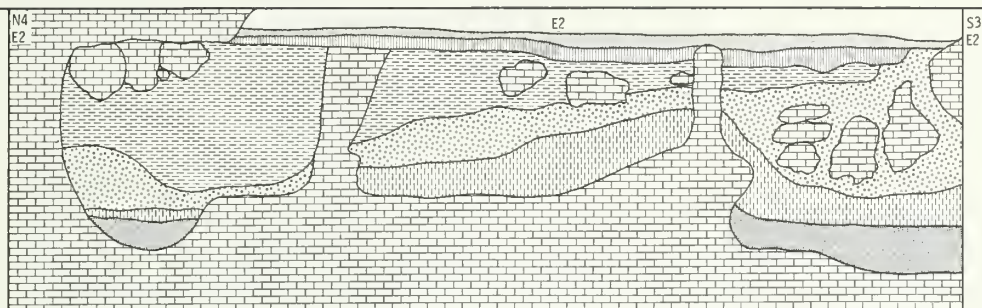
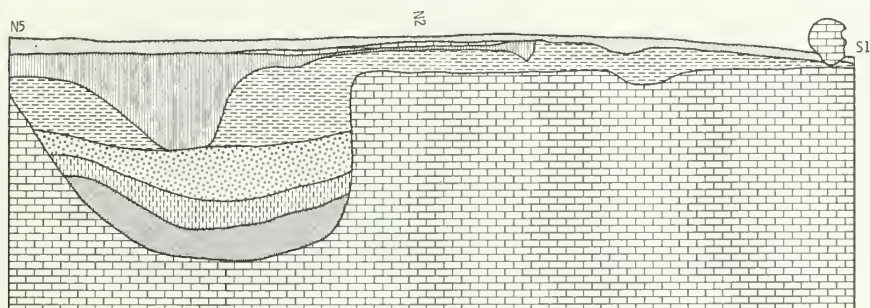


Fig. 6. Profiles of El Riego west (left) and El Riego east (right).

NORTH-SOUTH PROFILES

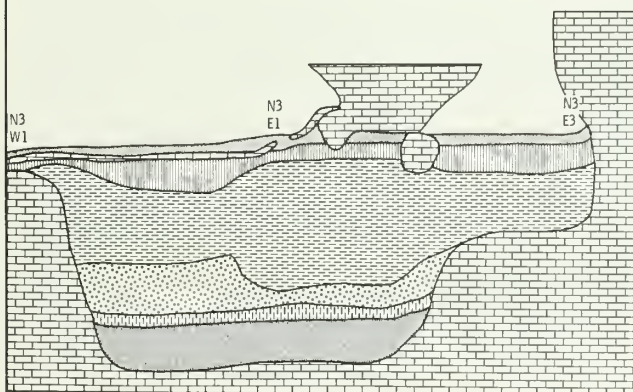


North-South E2 Profile

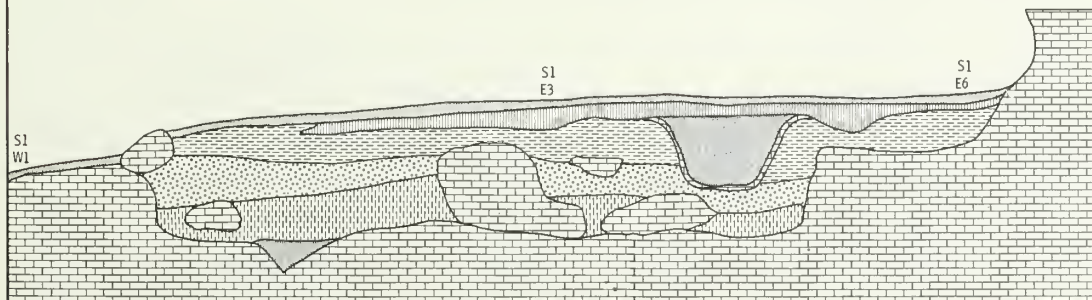


North-South 0 Profile

WEST-EAST PROFILES



West-East N3 Profile



West-East S1 Profile

KEY

- Zone A (East) - Layer 1 (West) -- gray-brown refuse
Occupation 10 Venta Salada Phase, 1450-1550 A. D.
- Zone A (East and West) -- plastered floor
- Layer 2 (West) -- dark brown refuse
Occupation 9 Venta Salada Phase, 1100-1200 A. D.
- Zone B (East) - Layer 3 (West) -- dark brown refuse
Occupation 8 Venta Salada Phase, 900-1100 A. D.
- Zone C (East) -- gray refuse
Occupation 7 Venta Salada Phase, 700-900 A. D.
- Zone D (East) -- dark gray to brown refuse
Occupation 6 Palo Blanco Phase, 550-700 A. D.
- Zone E (East) - Layer 3-4 (West) -- gray refuse
Occupation 5 Palo Blanco Phase, 300-500 A. D.
- Zone F (East) -- gray-brown refuse
Occupation 4 Palo Blanco Phase, 300-500 A. D.
- Layer 4 (West) -- dark brown refuse
Occupation 3 Coxcatlan Phase, 4300-4000 B. C.
- Layer 5 (West) -- light brown refuse
Occupation 2 El Riego Phase, 5800-5400 B. C.
- Layer 6 (West) -- pale gray refuse
Occupation 1 Ajureado Phase, 7500-6800 B. C.
- Travertine rock of the cave

one meter distance

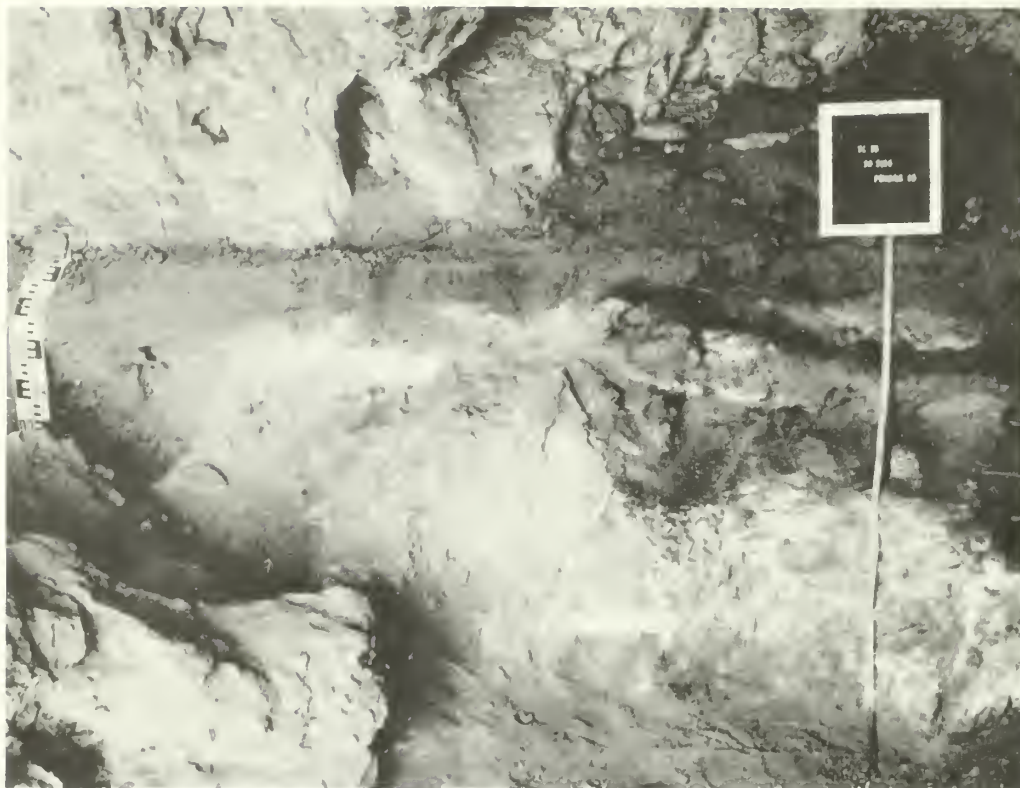


Fig. 7. The E5 profile from N1 to S2, showing the five zones of occupation of Tc 35e.



Fig. 8. The N4 profile from W7 to W11, showing the six layers of occupation of Tc 35w.

About the time this last trench was being dug we began excavation in Tc 35w. Here, we initially dug Square N5W5 by arbitrary levels and then moved eastward and westward by the stripping technique to obtain a 1-meter-wide trench between the N5 and N6 axes from W3 to W12. At the completion of this trench we named the strata Layers 1 to 6, photographed the long profiles, and assessed our digging tactics. We then moved southward and northward by digging alternate squares into the N4 profile and N6 profile and then dug the squares in between. Next we dug into the N3 squares from the W3 axis to the W10 axis, and then into the squares in the niches in the northern part of the cave by the same technique (Fig. 8).

Having briefly described the methods and techniques by which we exhumed the artifacts and how they were recorded, we shall now attempt to describe the way of life of the occupations. In the previous volumes we described, listed, and illustrated many of the artifacts, ecofacts, burials, and other features in terms of their cultural layers or strata. Our purpose basically was to establish a chronology for the whole valley. The artifacts and ecofacts were treated as time markers, or index fossils, and our typological studies allowed us to arrange them in chronological order. The sequence of types and complexes of types also allowed us to arrange the strata of each site in sequence. Material from some of these sequential layers was radiocarbon dated, so relatively good estimates could be made for all layers including those from El Riego Cave. Further, comparisons of the sequential complexes of types from the dated strata allowed us to classify the remains from each layer or component into a series of periods or cultural phases. Thus, before we began our attempts to reconstruct the way of life of the various components, the basic chronological position was well understood. In El Riego Cave the sequence had been firmly established (see Table 1).

From many standpoints the following reconstructions are a whole new approach or way of looking at the archaeological data. The various zones or layers are not treated as units in a stratigraphic column but rather are considered as archaeological components representing occupations by single cultural groups at what for heuristic purposes may be considered one moment in time, or one discrete period in which there was no significant cultural change. It means that we are now looking at the artifacts and ecofacts, not as time markers, but as things made or grown by man and used by him at specific periods. It also means that complexes of artifacts and ecofacts on a particular floor are not just elements of cultural units or phases,

TABLE 1
Sequence in El Riego Cave (Tc 35)

	West Niche	East Niche	
<i>Late Venta Salada Subphase</i>			
Occupation 10	Layer 1	Zone A	1450-1550 A.D.
<i>Early Venta Salada Subphase</i>			
Occupation 9	Layer 2		1100-1200 A.D.
Occupation 8	Layer 3	Zone B	900-1100 A.D.
Occupation 7		Zone C	700-900 A.D.
<i>Late Palo Blanco Subphase</i>			
Occupation 6		Zone D	550-700 A.D.
Occupation 5	Layer 3-4	Zone E	300-500 A.D.
Occupation 4(?)		Zone F	300-500 A.D.
<i>Coxcatlan Phase</i>			
Occupation 3	Layer 4		4300-4000 B.C.
<i>El Riego Phase</i>			
Occupation 2	Layer 5		5800-5400 B.C.
<i>Ajuereado Phase</i>			
Occupation 1	Layer 6		7500-6800 B.C.

but that they represent congeries of things made and used in the various actual activities that occurred during a particular occupation. Thus, in the following sections we shall present a sort of paleoethnology for each of our 9 or 10 sequential occupations.

These reconstructions based upon the study of each artifact and ecofact on each floor not only determine what activities were involved. They also consider spatial concentrations of artifacts or ecofacts on a single floor which probably were not due to chance, but indicated specific activities in a particular area. Obviously, determining the exact nature of the activity for each artifact or each activity area is highly interpretive, but we feel such interpretations must be made, for they may lead to future hypotheses, to be tested by archaeological interpreters with newer and better methods and techniques.

Our written interpretations of the activities of each occupation below, as in succeeding chapters, are accompanied by maps of the floors themselves with the artifacts and ecofacts plotted on the floor by Cal. Comp. line plotter. On these plots the various classes of artifacts are represented by symbols—projectile points are triangles, end-scrapers are squares, ground stone tools are diamond shapes—and with each symbol a number represents a type in that class. Usually, number one is the earliest type of any particular class (as can be seen in the tables in Volumes 1, 2, and 3) while the increasingly higher numbers represent the progressively later types. Further, the plotter located some of the archaeological specimens and features found in situ in

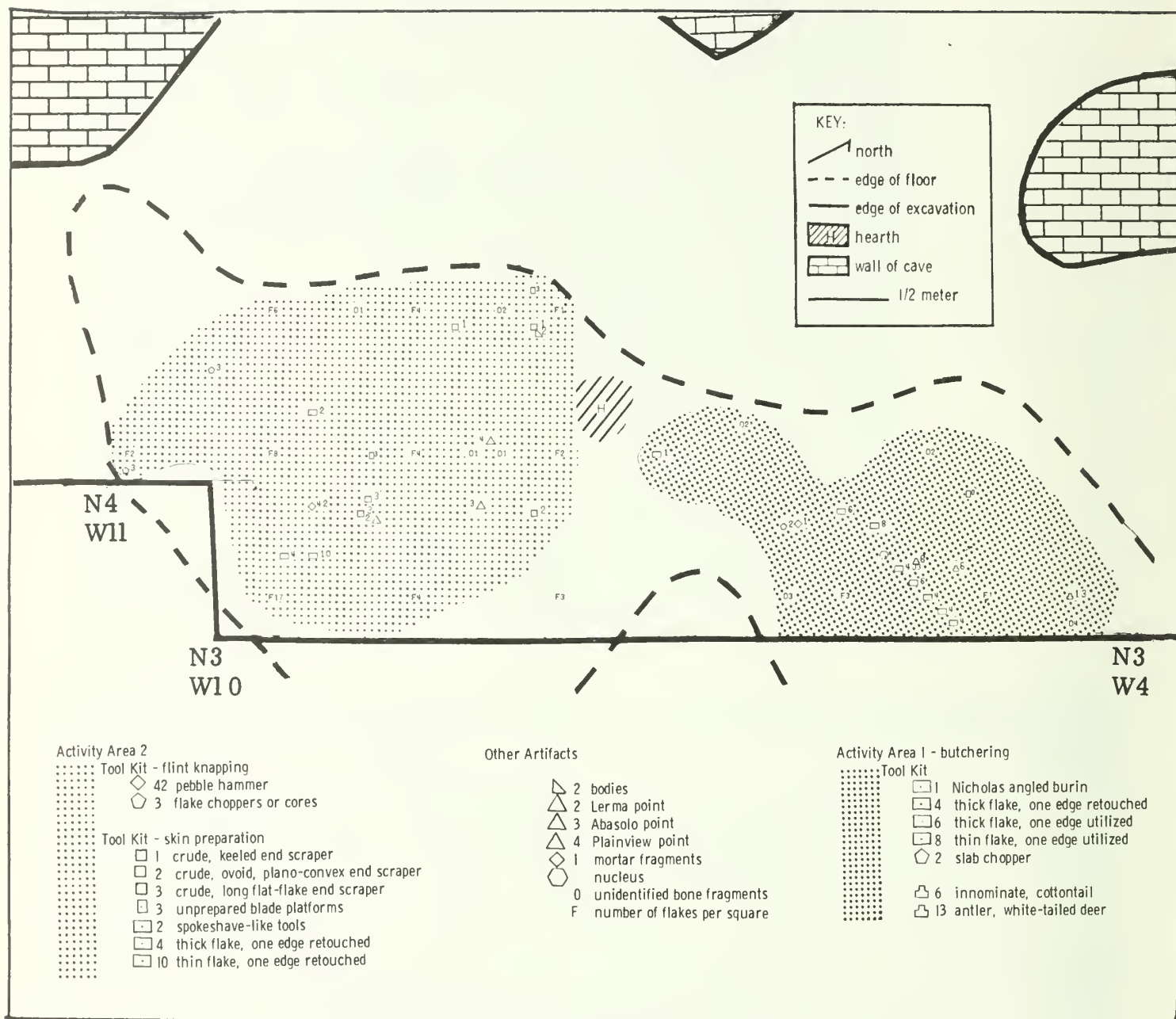


Fig. 9. Activity areas of Layer 6 of Tc 35w with a key to their ecofacts and artifacts.

their correct position, but others that were recorded only as to their 1-meter-square location the plotter has arranged in neat diagonal lines. Either way, however, they illustrate the concentration or lack of concentration of what we found. These plots, we believe, have considerable value, for they show the basis for our interpretations of the activities described in the text. More importantly, they place on record every artifact and ecofact we unearthed in every component for others to interpret as they see fit. We shall now pro-

ceed to give our interpretations of the activities that occurred during each occupation at El Riego Cave, beginning with our earliest component.

The Way of Life of Layer 6

Layer 6 overlay water-deposited travertine rock in the west niche of Tc 35. In the overlying Layer 5 as well, water-deposited travertine suggest that, during these first occupations, water was available within this shelter, if only in the form of dripping.

This conclusion is in agreement with that of Jean Brunet who studied the local geology and hydrology (cf. Vol. 1 of this series, Chap. 5) and who suggested that, on the basis of modern trends of the falling of the water table, the water was roughly at or slightly above the elevation of the cave floor itself at the time of the first occupations of El Riego Cave. Thus, the lush vegetation and abundant animal life may have been even more so during this first occupation.

The stratigraphy of Layer 6 seemed to be composed mainly of a pale gray ash and burned or disintegrated refuse of a maximum thickness of less than 20 cm. Although the area of the zone was outside or beyond the overhanging roof of the present shelter, a series of large surface rocks south of the N3 axis (where we didn't excavate), suggested that the entire zone was within the cave at the time of the first occupancy. Excavation uncovered a dumbbell-shaped area of about 13 square meters (Fig. 9) extending roughly from N3W4 to N5W11; by projecting the southern edge of Layer 6 into the undug rock-covered area south of the N3 axis, we suggest that the total floor could have covered from 14 to 16 square meters. No fire pits were found within or on this relatively thin occupation; however, we consider the 17 fire-cracked rocks recorded in the field notes as occurring in Square N4W7 to have been a hearth area, albeit ill-defined. All this suggests a relatively brief occupation or occupations by a limited number of people, and the concentration of artifacts strongly suggests that it was a single occupation. It is difficult to determine exactly what season of the year this occurred. It may have been sometime between December and June; that is, the dry winter and spring seasons. We discovered a mortar for grinding seeds, most of which become available in the spring, and there were no bones of wet-season animals that had been so abundant in the El Riego locality.

Without vegetal or feces preservation, reconstruction of a subsistence pattern must obviously be speculative. However, we do have some hints as to methods of food procurement and preparation. Plainview, Abasolo, and Lerma point fragments, all of non-barbed projectile points, along with unidentifiable bone fragments of associated large mammals, indicated that the inhabitants did some hunting, perhaps lance ambushing. The bones of two rabbits may indicate trapping; and the tecamate mortar may indicate seed collecting. The (unlocated) scraper-plane fragment and the type of wear on the teeth of the human jaw found in N4W6 suggest leaf-collecting and chewing. Food was roasted in the area of the fire-cracked rock as indicated by the

17 burned rocks. The hammerstone, blocky-core and flake choppers with 19 splinters of bone suggest marrow extraction. The mortar was used for grinding the seeds and the scraper-plane for pulping the plants. It seems significant that 17 of the 22 bones (including the two identified as rabbit and one as deer), 7 of the 10 side-scrapers, and the single slab chopper (all with thin edges ideal for cutting something soft like meat) as well as the mortar occurred to the southeast of the hearth area. Further, most of the splinter bones and the burin as well as four scrapers with step retouching ideal for scraping hard objects such as bone occurred in this region. Here bone-working was undertaken. All of this suggests a definite activity area (Area 1) (Fig. 9) and, moreover, the nature of the activities (bone-working, butchering, and other food preparation activities) suggest that this might have been where the women worked.

North and west of the cooking region is an area (Area 2) where we uncovered all the point fragments, the hammerstone, the blocky-core choppers and the scraper-plane fragment (not located as to exact position), 41 of the 47 flint chips, 7 of the 10 obsidian chips, and the single spokeshave. This could have been the men's working area where flint was knapped. Study of these tools and chips, as well as of those in the other parts of the zone, allowed us to glean some information about their techniques. The blocky-core choppers and the scraper-plane, 1 side-scraper and 5 chips, all of which had lengths less than twice their widths, showed evidence of unprepared striking platforms. This and the kinds of fracture on the striking platforms and the pebble hammer indicate that flinty pebbles or imported obsidian were selected and that the cortex was removed by a series of percussion blows until a blocky or conical/conoidal core was obtained. One flat surface near an acute angle to the edge of the core was used as a striking platform and flakes or crude blades were removed from the adjacent sides by percussion. Many of these flakes were then shaped into side-scrapers and end-scrapers, burins, spokeshaves, and flake choppers by direct unifacial percussion blows, while a few of the large flakes were struck bifacially to become projectile points. The Plainview point shows basal and basal-lateral edge grinding, indicating that before the points were finally shaped a platform for percussion blows was formed by grinding on parts of the point's edges.

Further, five of the end-scrapers have steep cutting edges, potentially good for scraping hard objects, and the two keeled end-scrapers and the thick side-scrapers with one edge retouched have step-fracturing of the

sort that occurs from scraping something hard, like bone or wood. The latter's association with the single spokeshave suggests that wood was worked; perhaps the shafts for the darts or the lances for the projectile points were manufactured in this western area. The scraper-plane fragment, two of the three blades, and five of the six end-scrapers in this same region may suggest the rather surprising possibility that, at that time, men were preparing skins.

A partially-burned human jaw was found in Square N4W6; these people may have practiced cremation or cannibalism during their sojourn in the cave.

The obsidian Plainview point and the 10 obsidian retouched chips were all of the Orizaba type obviously imported into the Tehuacan region. The relatively meager remains suggest indirect non-specialized procurement and distribution in an informal manner. That is, the raw obsidian had passed from the original miner at Orizaba through a whole series of people before it arrived in Tehuacan, to be chipped into a Plainview point by someone in El Riego Cave. The Lerma, Plainview, and Abasolo points, the flake chopper, the types of end-scrapers and blades may be cited as evidence that Layer 6 is a component of the Ajuereado Phase. The lack of extinct animal bones, the mortar, and the seriation of the artifacts presented in Volume 4 of this series all indicate that Occupation 1 was late in that period or phase, perhaps between 7500 and 6800 B.C.

The Way of Life of Layer 5

Layer 5 overlay and extended slightly beyond Layer 6 in the west niche. The zone had a maximum thickness of over 30 cm. and varied in color from an almost creamy-white to a light brown. It seems to have been composed of refuse and windblown dust that, in part, had undergone some maturing process of chemical change. We excavated about 30 square meters; but the general outline of the layer suggested that as many as 5 to 10 square meters more may have existed to the south in the unexcavated portions of the cave. Like Layer 6, much of the area was outside and to the south of the overhanging roof of the present shelter. Large boulders in and on the zone suggest where the roof may have sheltered most of Layer 5. The bases of two stalagmites of travertine were located at N7.6W9 and N4.8W4. Water was probably available within the shelter at the time and the oasis zone around the cave must have been even more lush than it is at present.

Although patches of ash were seen at various depths within the zone, no hearth nor any definite floor or floors were found. Further, artifacts occurred at various depths, and in no areas of concentration, or con-

geries, of artifacts. This strongly suggests that Layer 5 represents a whole series of occupations over a considerable span of time. Whether the occupations were by macrobands, or by macrobands and microbands, or by microbands alone could not be determined, although from the size of the shelter we suspect it must have been by microbands alone. Seasonality of these occupations is equally difficult to ascertain, but the lack of wet-season animals does suggest that most of the occupations occurred in the dry seasons. The presence of seed grinders may indicate that some or all occupations may have lasted into the spring season.

The large assortment of projectile points (2 Agate Basin, 1 La Mina, 1 Trinidad, 2 Hidalgo, 1 El Riego, 2 Abasolo, 1 Lerma, 4 body fragments, and 8 tips) (Fig. 10) attests to the importance of hunting for these peoples. Other artifacts used in the complex of activities surrounding hunting would have been the crude blades (8), the side-scrapers (29), the end-scrapers (20), the scraper-planes (31), the bifacial knives (5), and the utilized flakes (17; 9 unlocated). Deer and cottontail skins were scraped and rendered usable by these tools (possibly pierced) and by the 4 flake graters. The meat could have been removed from the bones and cut up into stew pot size by the thin bifacial knives and the crude blades, which may have been hafted.

Although we found no preservation of vegetal material, the occupants certainly collected plants; many grinding implements were found among the artifacts, and the teeth of the cremated adult female showed the type of wear that comes from chewing leaves. The hemispherical mortar, the mortar fragments (3), the pebble hammerstone, the muller-mano fragments (6), the boulder milling stone, and the ovoid muller all could have been used to grind numerous plant materials into digestible, if not delectable, forms. Once cooked, these ground plants, along with rabbit or deer meat, may have been served from the stone bowl. Of course, many of the artifacts previously described as possible hunting equipment could have been used in the collection and preparation of plant products as well. The crude ovoid biface and the eleven choppers may have had a multitude of purposes.

Burned bones of an adult female (a tooth, limb fragments, vertebrae, and skull fragments) from Square N4W5 may be cited as further evidence of subsistence activities; that is, some sort of cannibalistic feast. However, burials 4, 5, and 6 (see Chap. 6) of Coxcatlan Cave, roughly of the same time period, were also burned and showed definite evidence of a cremation ceremony. This suggests that the bones in Layer

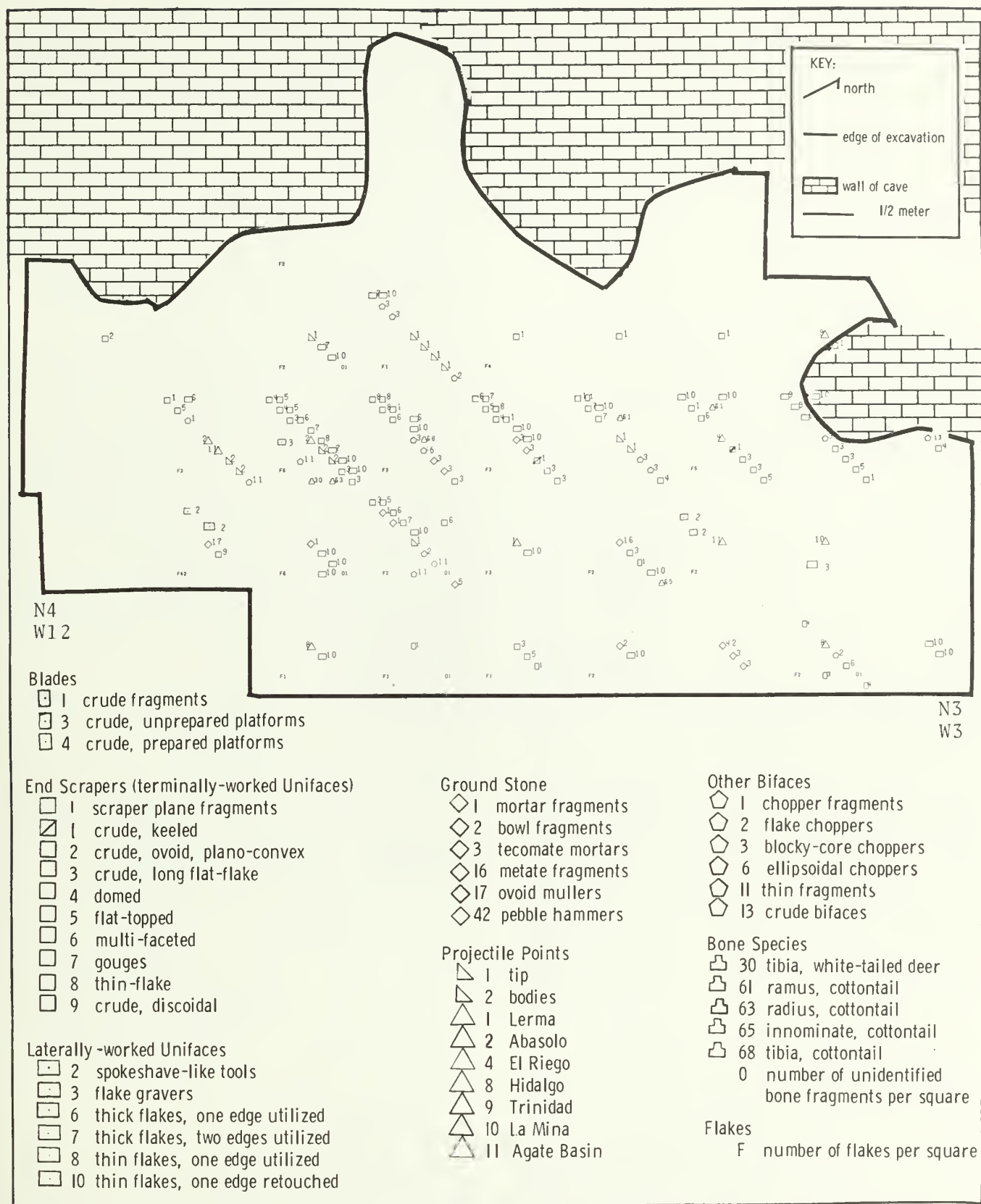


Fig. 10. Layer 5 of Tc 35w. Artifacts and ecofacts keyed below.

5 of Tc 35w are probably evidence of cremation, one of their customary modes of burial. Be that as it may, most of the cultural evidence from Layer 5 suggests more mundane activities.

The five gouges and four spokeshaves may have been used to remove bark and shape pieces of wood into useful objects in a woodworking industry. Two of the gouges have deep concavities with step fracture suggesting bone-scraping. The scraper-planes, side-scrapers, and choppers could have been employed as well.

Flint and obsidian chips and the ground and pecked stone tools were numerous. The obsidian chips represent raw material traded or obtained by special trips to other regions. Most of the flint appears to have come from nodules found in the local limestone at El Riego, a further inducement for living there. What we call the flat-topped (8), the multi-faceted (7), and the domed (5) scraper-planes, as well as the blocky-core choppers (6), all proportionately high in terms of the total number of artifacts, may also have served as cores, worked out of local nodules. There were also a few pieces of honey flint which could have been imported from farther down in the Tehuacan Valley. The multi-faceted and blocky cores seem to indicate that many of the flakes (38) and blades (2) may have been struck from cores with prepared striking platforms. About half of these had lengths more than twice their widths, suggesting that half were struck from the cores by hammers of materials softer than stone, while the rest may have been removed by blows from pebble hammerstones. Some of the flakes (11) and one blade also may have been struck from unprepared cores by direct percussion blows with a pebble hammerstone, such as some of the flat-topped and domed scraper-planes. As in the previous horizon, most of the tools were made directly from flakes, but about 40 percent of the thicker flakes may have been worked bifacially by pressure or well-controlled percussion. Further, stemmed projectile points hint at a new method of hafting the slotted shaft to the point; that is, rather than applying pressure only around the shaft, string was wrapped around the stem of the point as well as around the shaft with its now deeper slot.

Their bulk suggests that the mullers, mortars, muller-metates, and stone bowls were not part of the baggage in the seasonal rounds (despite Mexico's tradition of "a woman's work is never done"). If these were not carried into the cave, then it seems logical that they were manufactured nearby or in the cave itself. Most are made from pebbles, limestone, or basalt, all readily available near El Riego. The hammerstone, mullers,

manos, and metates would have taken little shaping other than by use. The mortars and stone bowl may have been first pecked or chiseled into their general form and then finished by grinding, perhaps with a mano or muller.

The projectile point types, grinding stones, and scraper-planes, as well as other tools, are all ample evidence for considering Layer 5 to be a component or series of components of the El Riego Phase. Trends of artifact types suggest that these occupations occurred in the general time period from 5800 to 5400 B.C.

The Way of Life of Layer 4

Layer 4 overlay and extended slightly farther than Layer 5 where it overlay the rock floor of the cave. In the excavated area of the cave it covered about 22 to 24 square meters, and may have covered an additional 8 to 10 square meters in the unexcavated portion to the south. Although much of this layer was south of the present overhang, it might have been entirely roofed over during the occupancies. No evidence was found to indicate that water was available in the cave at this time, and there is a good possibility that the water table had sunk below the floor of the cave. Brunet's trends for the falling water table would indicate that seeps of water might have been available only a few meters below the floor level of Layer 4. (See Vol. 1 of this series, Chap. 5.)

The stratum had a maximum thickness of about 40 cm. and was brown to dark brown with a few patches slightly lighter in color. The bottom of the layer was readily distinguishable from Layer 5 and we had no trouble peeling off the stratum when we were excavating. This was not the case with the top of the stratum for, in some areas, it gradually merged into the overlying dark- to blackish-brown stratum of Layer 3. In other places the two were indistinguishable; the top of Layer 4 had a very irregular shape with all sorts of little bumps and pits in it as if it had been exposed for a long period of time and had been subject to considerable erosion. In what we thought was the top 10 cm. of Layer 4 we found the occasional potsherd that obviously represented intrusions or some sort of mixing. For this reason we dug an arbitrary 20-cm. level at the junction of Layers 3 and 4, called Layer 3-4, which gave us relatively unmixed stratum from both above and below.

Thus, we see Layer 4 as a relatively thick zone without floors and with artifacts occurring at various depths, a small ash pit dug down from the top of the layer in Square N5W6, a heavy concentration of charcoal in the middle of the layer in Squares N5W6 and

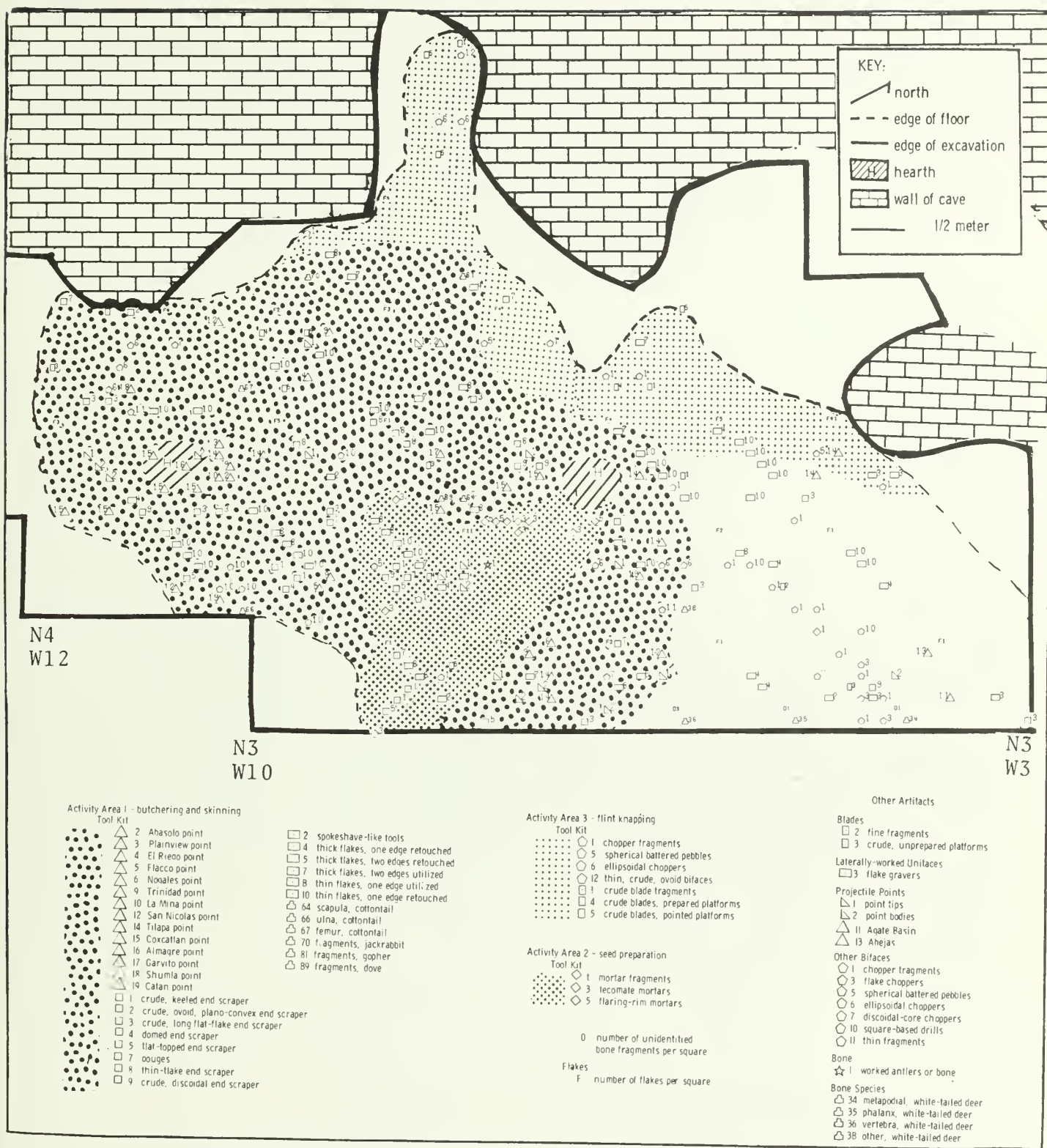


Fig. 11. Activity areas of Layer 4 of Tc 35w with a key to their ecofacts and artifacts.

N5W7 and, in almost all of Square N5W10, a high concentration of ash. All of this caused us to suspect that this zone was laid down by man and nature over a considerable length of time, and that it included within it a number of short-term occupations.

There is, however, evidence that seems to be diametrically opposed to this interpretation, that is, evidence that indicates a single occupation over a relatively short period of time. First of all, comparison of the artifacts from various depths within the stratum, and from different horizontal parts or squares of the layer, reveals many similarities, enough so that we unhesitatingly classify materials from any part of the layer as being solely of the relatively short Coxcatlan Phase. Thus, even if it were not a single occupation as this would suggest, certainly it was a series of occupations by people with the same material culture. Secondly, when we plotted the various artifact types by squares we found some significant concentrations of related types. The majority of the flakes and blades were in the northeast part of the cave (Area 3), the majority of the choppers in the east section, most of the projectile points in the west section (Area 1), and the ground stone materials in the center (Area 2). This pattern of activity areas (Fig. 11) suggests a single occupation. Moreover, the presence of tetecho fruits indicates a dry season while the mortars might mean a spring occupation or occupations, and there were no bones or metates that would indicate a wet-season occupation or occupations. In a lush region susceptible to agricultural practices by Coxcatlan peoples we can interpret this as indicating a single non-wet season occupation rather than a series of occupations. Discussion during the analysis revealed that still a third and more likely interpretation is possible. This hypothesis would see Layer 4 of Te 35w as having been occupied intermittently, usually not in the wet season, by a number of bands all having a Coxcatlan Phase-type material culture. During some of these brief occupations specialized activities occurred on certain sections of the floor and at other times other activities occurred on other parts of this same zone. Thus, the various activity areas do not represent activities of a single time, but rather different activities at different times. There seems to be a number of interpretations of the occupations of Layer 4 and, though we prefer the final one presented above, all seem equally possible and plausible.

Hunting was, of course, an important activity of the inhabitants of the cave. Projectile point fragments (53) were of a wide variety of types (5 Coxcatlan, 5 Tilapa, 4 San Nicolas, 4 Trinidad, 2 Catan, and a single exau-

ple each of Shumla, Garyito, Almagre, Abejas, Agate Basin, La Mina, Nogales, Flacco, El Riego, Plainview, and Abasolo). These, and 10 point tips, 8 body fragments, and 4 bones of at least one deer all occurred in Layer 4. Slightly over half of the points were in the northwest section of the cave (Activity Area 1) so evidently hunting was the major concern of at least one occupation; still, the occurrence of some points in all areas seems to suggest that other occupations hunted also. Bones of two cottontails, one jackrabbit, one gopher, and one dove may indicate a trapping activity. Of 12 grinding tools (3 flaring-rim mortars, 2 mortar fragments, and 7 tecomate mortars), 11 were in squares in the center of the cave south of the charcoal-filled square (Activity Area 2). One domed and 4 flat-topped scraper-planes, 2 *Agave* leaves, and a tetecho fruit in Square N4W5 all indicate that one or more of the occupations were concerned with plant collecting at least of the seed-collecting, leaf-cutting, and fruit-picking varieties. With a possible exception of two mano-mullers with small back-and-forth scratches on them as if they had been used in a metate, there was no other direct evidence of agricultural activities in Layer 4.

Evidence of food preparation was not as striking. One burned bone and a burned *Agave* leaf did suggest roasting, but the relative lack of fire-cracked rock indicated that live coals were used rather than hot rocks. The presence of mortars and mullers of course means some food, probably seeds, was pounded or ground. There was no evidence that bones were smashed for the marrow, although we did uncover 35 choppers. Of course these, as well as the 10 ovoid bifaces, 55 side-scrapers, 17 blades, as well as other tools and flakes, could have been used to cut, butcher, and generally prepare the food for eating. Unlike other Preceramic zones from other caves, Layer 4 of El Riego west gave us little good information about subsistence.

We have abundant evidence that flint knapping was a major activity during at least one of these occupations. About a third of the artifacts used were of imported obsidian, a third were of El Riego chert, either from local pebbles or from chert beds in the limestone or travertine, and the rest were from unknown sources. About two-thirds of the flakes were from local cherts, one-fifth from obsidian, and the rest from unknown sources. An important by-product of flint knapping were the 132 chips which had a rather significant spatial distribution. The majority of them were found in the north half of the cave, mainly in the northeast section. The 17 blades found show a similar distribu-

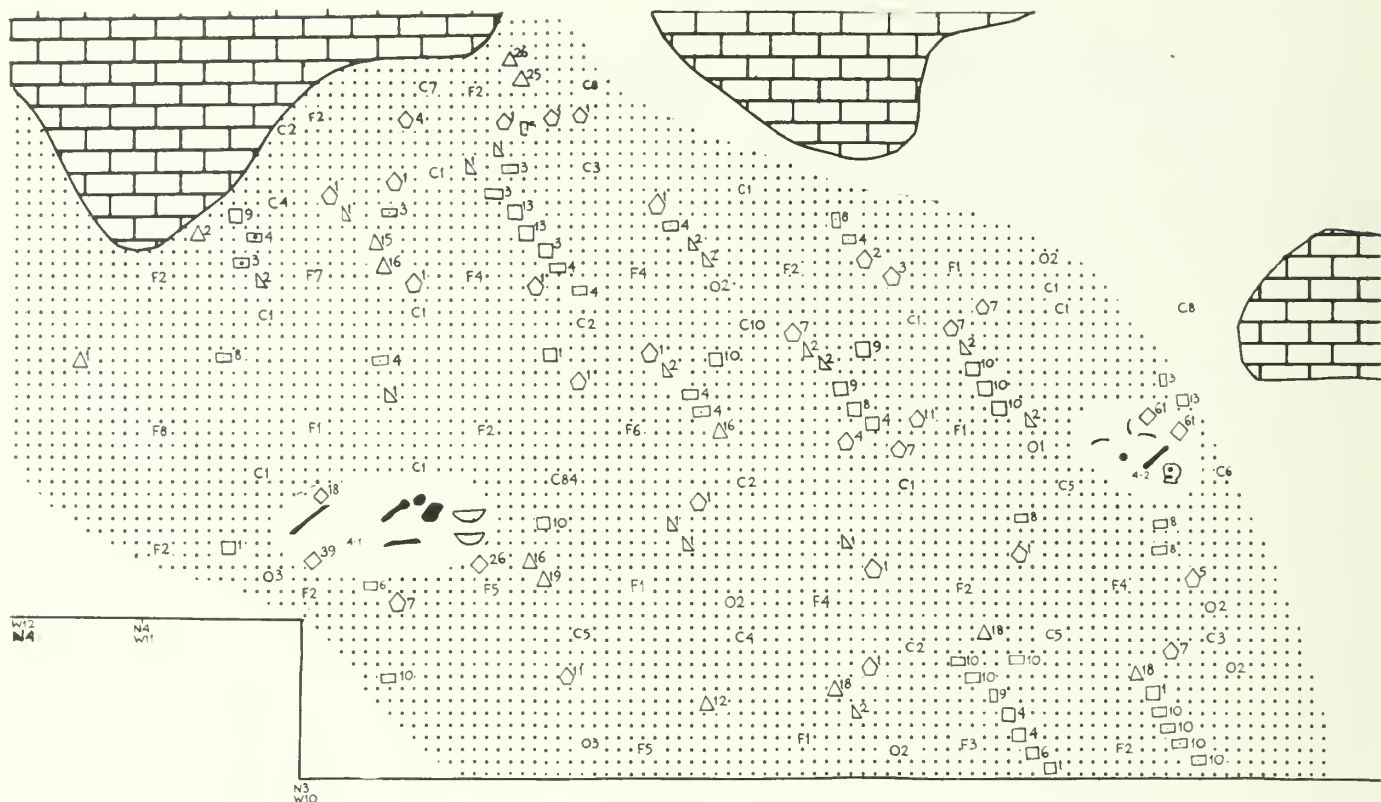
tion; 13 of them came from the north half of the cave, 8 of these from the northeast section. The 35 so-called choppers seemed to be associated with the flakes and blades because of their high concentration in the same northeast section (i.e., the 15 fragments, 9 discoidal cores, 3 blocky cores, 3 pebbles, 3 ellipsoidal and 2 flake types). Most of these choppers were made of El Riego chert. Thus it was in the northeast section of El Riego Cave west where an industrial flint-knapping activity (Area 3) resulted in Coxcatlan artifacts made mainly of El Riego materials. Now let us see how the artifacts were manufactured.

The initial process was obtaining the raw material. The major source was local: about 80 chips and 60 artifacts were of El Riego whitish-gray chert. About 10 chips were pinkish in color. These were of El Riego whitish chert that had been baked or heat-treated for a better conchoidal fracture. A small proportion of the flakes seemed to have come from pebbles; most of the pebbles were blockish and probably represented chunks of broken-off strata in the local limestone beds. Two other sets of materials were less numerous. Obsidian (about 60 tools and 20 chips) came from a wide variety of volcanic deposits; chalcedonies probably came from a number of unknown sources. Many of the obsidian tools may have been brought into the cave in their final form, but some blocks of obsidian were evidently imported and then further chipped in the cave. Although it was difficult to determine, it seemed that about half the unidentified flint came from pebbles and half from blocks. After the pebbles had been brought into the caves they were split in half by percussion blows to form cores, perhaps by the use of what we call discoidal choppers. Three of these cores were struck by percussion at the edge of the broken surface to form pebble choppers. Probably all the scraper-planes were made from split pebbles that had had blows struck along all the edges of the split surfaces. The four flat-topped scrapers probably had an additional blow or blows against one or more sides in order to remove the end of the original pebble. Some of the bifacial choppers may have been whittled down to form from pebbles; this too was difficult to determine. Most of the cores, however, seemed to have been made from blocks of flint. The three blocky-core choppers are probably examples of this type of initial core used.

Miss Nelken's study of the flakes, blades, and unifacial tools with adhering striking platforms reveals something of how these cores were struck. (See Vol. 2 of this series, Part I.) Her measurements revealed that the majority of the flakes had lengths of more than

twice their widths. (This set of proportions of length-width ratios is just about the opposite of that in Layer 6, the underlying Ajuereado component.) We felt that these flakes with lengths more than twice their widths were probably struck by implements softer than stone, while the others were struck by stone or by some material of a similar hardness. The over-all data on these 65 objects revealed 3, 4, and 6 with lengths less than twice their widths (pointed, unprepared, and prepared striking platforms respectively), while 7, 14, and 31 had lengths more than twice their widths with unprepared, prepared, and pointed striking platforms. We have interpreted the data, then, as indicating that cores were usually struck by implements softer than stone, almost never by stone, and by indirect percussion. The cut and split antler tips may have been the punch used in indirect percussion. Cores with prepared striking platforms were also usually struck directly by objects softer than stone (21%), a few may have been struck by stone. Rarely were platforms unprepared and even these were usually struck by objects softer than stone (11%), and only rarely struck by stone (6%). Although, as we have seen, most of these cores were struck casually, a few were struck with more precision, that is, three or more blows struck parallel or in the same direction, one next to the other. The by-products of such blows were blades, and from the blades it would appear that most commonly (6) the blades were struck off by indirect percussion. These blows by objects softer than stone on either prepared (3) or unprepared (4) platforms produced the blades from these polyhedral cores or nuclei. One of the most carefully-made blades was struck from an obsidian bullet-shaped nucleus.

Some of the flakes struck by the techniques described above were utilized without further work: 11 thin longer flakes were used on one longer edge and 6 thicker ones were used in a similar manner. Some of the other thin flakes were fashioned into tools by unifacial pressure retouching. Two were pressure retouched on one of the shorter ends, and 27 were retouched along one lateral edge, 4 were notched on one lateral edge, and 3 were retouched to a point on one end to become graters. Also, 5 thick flakes were also unifacially retouched, 4 on one side and 1 on two edges. Even more flakes were sharpened by percussion blows. Six were so done on one long lateral edge of a thick flake, 10 on one shorter end of a flake, 5 on all edges to make discoidal end-scrapers, and 1 to make a discoidal scraper-plane. Other relatively thick percussion flakes also received percussion blows, but these were done bifacially. Six gouges, 2 flake choppers, 1



Activity Area 1 - Layer 3-4

Food and skin preparation

- 3 flake graver
- 4 thick flake side scraper, one edge retouched
- 6 thick flake side scraper, one edge utilized
- 8 thin flake side scraper, one edge utilized
- 10 thin flake side scraper, one edge retouched
- 3 crude blade, unprepared platform
- 5 crude blade, pointed platform
- 8 fine blade, pointed platform
- 9 fine blade, snapped two edges retouched
- 1 scraper-plane fragment
- 3 crude, ovoid, plano-convex end scraper
- 4 crude, long, flat-flake end scraper
- 6 flat-topped scraper-plane
- 8 gouge
- 9 thin flake end scraper
- 10 crude, discoidal end scraper
- 13 fine, ovoid, plano-convex end scraper
- 1 chopper fragment
- 2 slab chopper
- 3 flake chopper
- 4 blocky-core chopper
- 5 spherical battered pebble
- 7 discoidal-core chopper
- 11 thin fragment
- 0 number of unidentified bone fragments per square
- C number of sherds per square

Hunting

- 1 point tip fragment
- 2 point body fragment
- Aberrant
- 2 Lerma
- 12 Agave Basin
- 15 Tilapa
- 16 Coxcallan
- 18 Gaviño
- 19 Shumla
- 25 Metamoros
- 26 Tehuacan
- Flint knapping
- F number of flakes per square

Activity Area 2

Burial 4-1 - adult male, fragmentary, partly burned

- ceramic vessels
- 18 muller or mano fragment
- 39 anvil stone

Activity Area 3

Burial 4-2 - eleven year-old, fragmentary partly burned

- 61 spherical bead

Activity Area 4 of Zone E-F

Subsistence and food preparation

- 4 thick flake side scraper, one edge retouched
- 2 blade fragment, fine
- 8 fine blade, pointed platform
- 9 fine blade, snapped, two edges retouched
- 5 domed scraper-plane
- 6 flat-topped scraper-plane
- 13 fine, ovoid, plano-convex end scraper
- 1 chopper fragment
- 3 flake chopper
- 5 flaring-rim mortar
- 21 ovoid muller
- 40 polishing pebble
- 20 two half hitches
- 5 -zea mays (maize)
- 8 persea americana (avocado)
- 18 p. vulgaris (common bean)
- 22 casimiroa edulis (white bean)
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)
- 29 celiba parvifolia roots (pochote)
- 30 celiba parvifolia pods (pochote)
- 38 opuntia spp. leaves (prickly pear)
- 43 sideroxylon cf. tempisque (cosahuicol)
- 48 unidentified cucurbita spp. (squashes and pumpkins)
- 49 c. mixta
- 54 agave spp. quids
- 55 agave spp. leaves

- 38 other, white-tailed deer
- 30 vertebra, white-tailed deer
- 30 humerus, white-tailed deer
- 3P scapula, white-tailed deer
- 3T antler, white-tailed deer
- 6C tibia, cottontail
- 6E innominate, cottontail
- 6J maxilla, cottontail
- 16B vertebra, opossum
- 16K uina, opossum
- 16L radius, opossum
- 19C vertebra, dog
- 19K uina, dog
- 31A fragment, hawk
- 31B hawk
- 0 number of unidentified bone fragments per square
- C number of sherds per square

Flint knapping

- 50 pebble hammerstone
- F number of flakes per square

Woodworking

- 1 polished stick
- 82 bark
- 83 wood

Ceremonial activities

- 31 head, Ticomán Type
- 90 stubby legs

Cache

- 5 zea mays (maize)
- 18 p. vulgaris (common bean)
- 54 agave spp. quids

Activity Area 5 of Zone E

Burial E1 - adult, fragmentary, burned

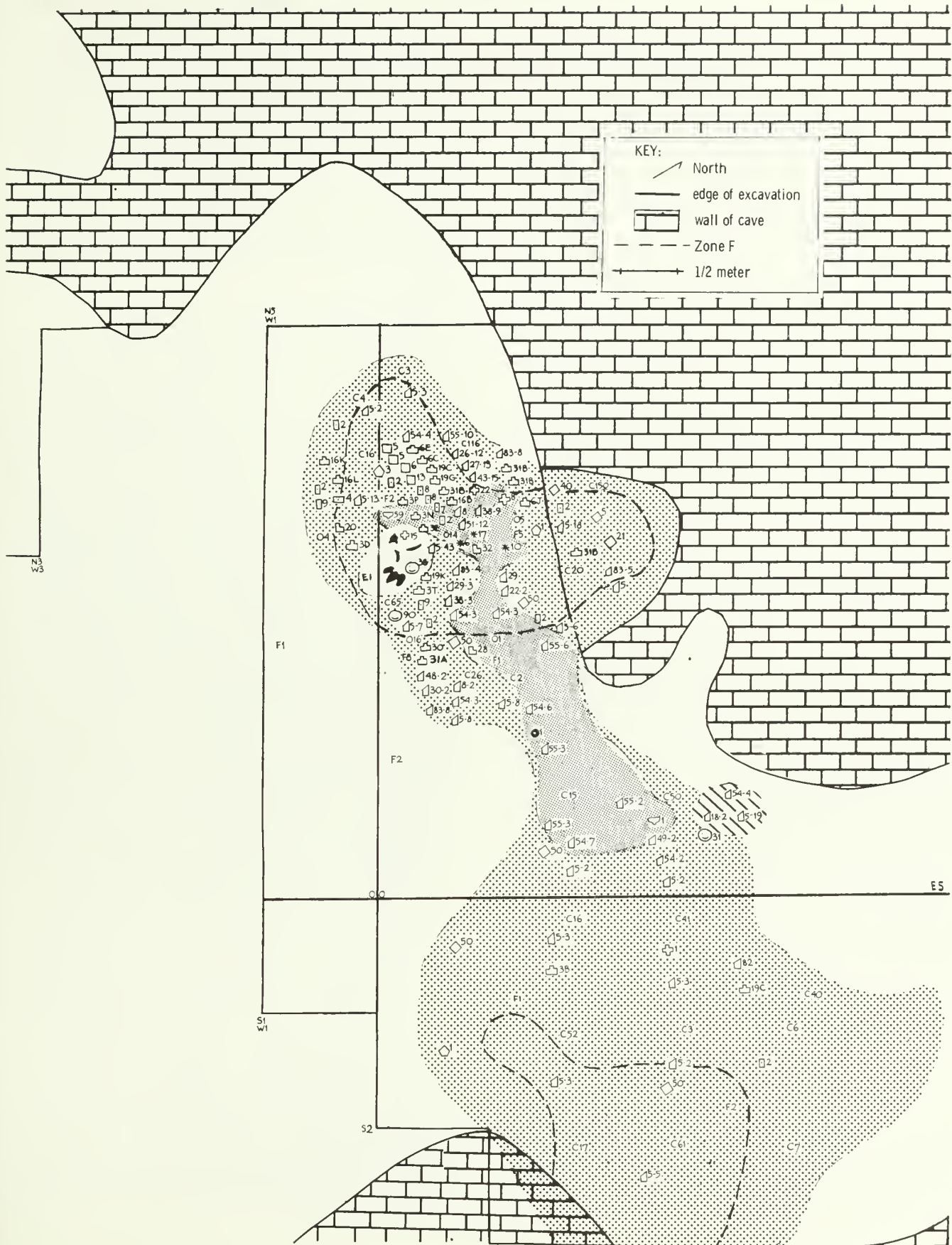
- 38 head, Ugly Baby Face Type
- 15 carved nut or seed

Activity Area 6 of Zone E

Weaving

- 2 blade fragment, fine
- 7 line blade, prepared platform
- 8 persea americana (avocado)
- 38 opuntia spp. leaves (prickly pear)
- 51 c. pepo
- 54 agave spp. quids
- 55 agave spp. leaves
- 3E phalanx, white-tailed deer
- 3N radius, white-tailed deer
- 8 cut or pierced gourd
- 22 cane tube
- 1 plain weave cloth
- 59 two pieces bark cloth tied with square knot
- 6 2-ply coarse cord (agave)
- 10 2-ply coarse cord (bast)
- 17 braid
- 28 square knot with loop (in 2-ply)
- 32 square knot with loop (in braid)
- 1 conical, low to medium high
- 0 number of unidentified bone fragments per square
- C number of sherds per square
- F number of flakes per square

Fig. 12. Activity areas of Layer 3-4 of Tc 35w (left) and Zones E-F of Tc 35e (right) with a key to their ecofacts and artifacts.



thin square-based bifacial knife, 2 ovoid bifacial knives, and 2 or 3 bifacial fragments, an Abasolo point, a Nogales point, an Almagre point, 4 point bodies, 1 point tip, and perhaps 1 Abejas point were worked in such a manner. Other thick flakes were initially roughened into form by bifacial percussion-chipping and the edges sharpened by bifacial retouching. These included 3 of the bifacial fragments, 5 Catan points, 1 Shumla point, 1 Garyito point, 5 Coxcatlan points, 8 Tilapa points, 4 San Nicolas points, 1 Agate Basin point, 1 La Mina, 4 Trinidad, 1 Flacco, 1 El Riego, 1 Plainview, 4 point bodies, and 9 point tips. It might be added that a number of the El Riego, Plainview, Flacco, La Mina, San Nicolas, and Trinidad points had edges ground to prepare them for pressure or percussion blows. A few others seemed to have been formed from blocky cores (not flakes) only by bifacial percussion blows. These included 2 bifacial fragments, 9 discoidal choppers, 3 ellipsoidal choppers, and probably the 15 chopper fragments. Thus we have a rather full picture of the flint-knapping activities of Coxcatlan peoples, at least in El Riego Cave.

Other stone was worked in the cave by grinding. Two of the mortars and one of the mullers were made of imported volcanic tufa, the others were made from local pebbles or boulders. The mortars were first gouged into their rough form, perhaps by the six chipped gouges, and then finished off by grinding, perhaps by the mullers. The mullers seemed to have been merely pebbles or chunks of rock picked up and used on a grinding stone without any additional shaping.

The remains of a deer, two cottontail rabbits, a jackrabbit, and a gopher in association with 109 artifacts (over half the total) which could have been used for scraping or working animal skins suggests that the inhabitants of Layer 4 were involved in some sort of tailoring of hides. The 5 thin flakes and 10 crude long flake end-scrapers, the 5 discoidal and 1 ovoid end-scrapers, and 1 domed, 4 flat-topped, and 7 fragments of scraper-planes all could have been used to remove the fatty epidermis and hair from animal skins. The 17 blades, 53 so-called side-scrapers, and even the bifacial knives, could have been used to slice skins and tailor the hides. The 4 graters could have been used to pierce hides for sewing.

We found 6 gouges and 4 spokeshaves that could have been used to remove bark and shave and scrape wood, evidence of a woodworking industry. Only 2 of the large flakes have nicks on one edge of the sort that results from whittling. Also, some of the 35 choppers could have been used to hew wood.

There was also some bone-working activity. One piece of antler was cut and split and a deer long bone had been whittled on both ends as if to make a tube. The artifacts mentioned above as possible woodworking tools also could have served as the tools for this bone-working industry. The 8 Tilapa, 8 Coxcatlan, 4 San Nicolas, and 4 Trinidad points, as well as the square-based knives, discoidal choppers, crude discoidal scrapers, fine blades, and many pointed crude blades indicate that the occupations in Layer 4 were of the Coxcatlan Phase, perhaps from around 4300 to 4000 B.C.

The Way of Life of Layer 3-4 and Zone E-F

Although it was not discernible in the stratigraphy, there was a long gap in time between the deposition of Layer 4 and the next occupations in Layer 3-4 in the west niche. We now have a more complex and rather confused stratigraphic situation. In the east niche, the deposit lay mainly in two deep depressions in the northwest and southeast sections of the travertine floor, completely separated by a rock barrier from any occupation in the west niche. Overlying the travertine floor in the two unconnected depressions of the east niche was a thick gray ashy stratum (Zone F) about 1.5 meters in diameter. It blended into an overlying, lighter colored whitish ash (Zone E) that capped the refuse in the depressions and ran across the travertine rock floor in the intervening area, connecting the two depressions. The majority of the artifacts and preserved plant remains were in Zone E. The few that occurred in the partially-covered Zone F were so similar that we considered Zones E and F to be a single occupation or single set of occupations—in other words, a single component (see Fig. 12). Our basis, i.e., similar pottery types, for connecting these materials with those of the west niche is equally poor. In the west niche where the top of Layer 4 gradually faded into Layer 3, a number of potsherds were of the same time period as those of Zone E-F of the east niche. The two areas had roughly the same percentage of sherd types. Sherds of El Riego Black in the east and west niches looked as if they had come from the same outflaring-rim bowl, and two body sherds, one from each area, could be glued together. Also, the sherds of Coxcatlan Brushed from the two areas looked to be from a single pot, and the one sherd of El Riego Marble-tempered from the west niche looked like part of the same comal represented by thirteen sherds in the east niche. Unfortunately, in the west niche sherds of this general type were scattered over 30 one-meter squares in or on the top of Layer 4, and nowhere was there a well-

defined floor level. Thus, in excavation we dug an arbitrary level (about 10 to 20 cm. thick) which included the bottommost part of Layer 3 and the topmost part of Layer 4. This arbitrary level obviously included occupational material roughly contemporaneous with that of Zone E-F of the east niche; it also included some refuse of the previous occupations in Layer 4 as well as a little of overlying Layer 3. Any interpretation of this confused occupation or occupations is subject to considerable error. Nevertheless, whether these were one or more occupations occurring at one or more periods, one fact does seem correct; that is, any or all of the occupations were by one or more very small groups of roughly the same time period. Furthermore, the flora and fauna from Zone E of Tc 35e hint that the occupations occurred at all seasons of the year, for we have a fragment of green antler that would have occurred in the winter; along with pochote remains of the spring, corn and beans of the summer wet season, and fruits of the fall. Thus, Zone E of the east niche and Layer 3-4 of the west niche seemed to represent a series of casual visits throughout the year by small groups at roughly the same period, or during a single continuous period, or a combination of both.

Any interpretation of the subsistence of such an ill-defined occupation or occupations is fraught with difficulties, not only because the occupations may not have been by the same group, but also because occupations may have varied considerably seasonally. However, we did have well-preserved vegetal food-stuffs, bones, and one coprolite (No. 47), mainly from Activity Area 4 of Zone E of Tc 35e, which do give some idea of the sustenance of this period or these occupations. The vegetal remains in Zone E reveal that over half (51%) of their subsistence came from a number of cultivated and/or domesticated plants including corn of late tripsacoid, Nal-Tel-Chapalote, early tripsacoid, and slender pop races, as well as avocado, *Cucurbita mixta*, pumpkins, common beans, sapote blanco, and such local fruits as chupandilla, cosahuico, and ciruela. The bones from at least one deer, two cottontail rabbits, one opossum, and one dog reveal that almost as much of their food (40%) was meat, while only a small amount (9%) came from wild food plants such as *Agave*, *Ceiba*, *Opuntia*, grass, and wild squash. This picture of their diet is somewhat confirmed by food remains in Cop. 47 which contained hairs of Mexican and Audubon cottontail rabbits along with fragments of corn, beans, and perhaps cassava, as well as what may have been tissues of fruits of domesticates and a few tissues of *Agave* leaves, the only evidence of a wild food plant. These plants, and

some of the artifacts, suggested what the subsistence activities may have been during this time period. The corn, beans, squash, and gourd may have been the result of dry farming, barranca agriculture, or irrigation agriculture—or any combination of the three. It was probably mainly irrigation agriculture as radio-carbon dating of a few of the nearby fossil canals has suggested. There were no tools, nor even any shaved sticks, to suggest that the occupants themselves were directly involved in agriculture. However, the various loops we found could have been used to carry agricultural as well as other produce and objects back to the cave. Pits of avocado, sapote, cosahuico, chupandilla, and ciruela in the refuse may also have been an indication that fruits were cultivated in orchards in the area.

The deer bones in the east niche and the many projectile points in the west niche (if they all were contemporaneous) may be taken as evidence that the occupants hunted, and the rabbit and opossum bones may indicate the use of traps or snares. The *Agave* leaves and the *Opuntia*, the wild squash and the pochote pods, as well as the chewed pochote roots, suggest such plant-collecting activities as leaf-collecting, pod and fruit-collecting, and root-digging.

In spite of the food remains, there was little evidence of food preparation; a cache pit was found in Square E3, but there were no hearths. The various blades, choppers, scrapers, and thin bifaces could have been used to cut up the meat of the animals they killed and butchered outside the cave. There were a number of burned bones in the east niche, but these could have been charred when the refuse was burned. There were no burned bones in the west niche. Evidence of grinding food is as poor as that of roasting meat. In the east niche there was a flaring-rim mortar and a muller, but stains of red ochre in both suggested paint rather than plant preparation. In the west niche there were what may have been a mano and an ovoid plano-convex metate, but whether these were actually associated with the occupations is open to question. Furthermore, none of the corn cobs showed that the kernels had been cut off for grinding. Perhaps the only good evidence for food preparation came from the sherds of 10 El Riego Orange bowls and a few ollas of Quachilco Mica with adhering carbon in their interiors. Food may have been cooked or boiled in these vessels. Also, one comal of El Riego Marble-tempered could have been used for grilling—perhaps tortillas. The other estimated 21 bowls, 2 cylindrical vessels, and 5 ollas of various types, as well as the fragment of cut gourd, all could have been used for

storage; the bowls could also have been used as eating dishes. The other reconstructed vessel is worth note. It is one of Texcoco Fabric-impressed which could have been used as an evaporating container in making salt.

We should point out that the evidence for food preparation in this zone is most peculiar when compared with that of other cave occupations of this time. Oddly enough, there is little or no evidence of roasting meat, nor of the women's activity of grinding food. Furthermore, while some pots were used for cooking, the majority were not, and bowls far outnumbered ollas and storage jars. We shall return to the significance of this peculiarity in later paragraphs.

Information about flint knapping is equally strange, for flint materials from the west niche in Activity Area 1 displayed techniques very different from those of Activity Area 4 in the east niche. The materials used, the techniques, and most of the artifact types (except for the Tehuacan point, the Matamoros point, the 3 plano-convex end-scrapers, and the 2 bifaces) from the arbitrary Layer 3-4 of Tc 35w were almost the same as those from the underlying Layer 4. One cannot help but suspect that most of these materials were made and deposited during the earlier Coxcatlan occupations, not during the time that the Classic sherds were deposited. It is, of course, possible that these Coxcatlan flint-knapping activities continued on up into Palo Blanco times, but the rather different materials from the well-defined deposits of Zone E-F of the east niche makes such a possibility unlikely.

Flint remains from the east niche in Activity Area 4 were more typical of these occupations. Chips and artifacts were predominantly of El Riego chert (43 flakes and 6 artifacts) and local pebbles (16 flakes). Only 14 flakes and 2 artifacts of foreign chert were found, and a number of flakes (9), artifacts (13), and parts of 2 cores were of obsidian. The obsidian evidently was brought to the cave in elongate cubes which were then chipped by direct or indirect percussion into bullet-shaped nuclei with prepared platforms. At least one blade was struck off the core by percussion by a hammer softer than stone. At least two blades with pointed platforms were struck off by indirect percussion. Two blades had their striking platforms snapped off and one edge retouched; 8 other blades without striking platforms were not worked. A lesser number of artifacts were made from both El Riego and foreign chert. Three large flakes or nodules were used directly as choppers. The chips revealed that most were first worked into domed or flat-topped scraper-planes like cores, most of which had prepared striking platforms

(13 out of 16), and most of the flakes (14 out of 19) were then struck off the cores by hammers softer than stone, although we found only 5 fragments of pebble hammerstones. One of these thick flakes was pressure-retouched into a side-scraper and another into a fine plano-convex end-scraper. In contrast to the earlier occupants, occupants of this time period used a blade rather than a flake or core as the basis of their artifacts and usually prepared the striking platform with a hammer softer than stone. Pressure-flaking or indirect percussion was used more often than direct percussion.

There were also stone artifacts, first gouged and then ground out of volcanic tufa—possibly one metate, one mortar, two mullers, and a paint stone. Hard green stone was ground into spheres and the spheres drilled through by a bow drill or hand drill with a long fine cylindrical tip. These beads probably were not manufactured in the cave; they might have been traded into the area.

One gouge found in the west niche in Activity Area 1 might have been used to remove bark from sticks. (A piece of bark and wood tools were found in Activity Area 4 in the east niche.) One stick so worked was ground to a point. *Carrizo* was sawed into lengths to make a tube, and a gourd was cut to form a vessel. One of the fine blades with two large nicks in one edge might have been the type of tool used in this woodworking activity. The tool used to carve the face on the avocado pit we found is unknown, however. An end-scraper was found in association with the bones of fur-bearing deer, rabbits, and opossum. The occupants evidently worked skins as well, although we found no leather or hide.

Textile and string-making was now a major industry (Activity Area 6). In the east niche *Agave* fibers provided a part of the raw material: leaves and chewed quids suggest that the two pieces of string we found could have been made in the shelter. One piece of string was made of two S-twisted fine yarns Z-twisted to form cords, and later was tied by two half-hitches to form a carrying loop, perhaps used to bring vegetal materials to the cave. The other was made of three coarse *Agave* S-twisted yarns that were braided and the braid tied in a square-knot to form a loop, perhaps the front loop of an ankle-strap of a sandal. Also, some of the specimens connected with the piece of cloth we found (see below) seemed to be of similar S-twisted yarns, Z-twisted to form cords. All were loosely hand-twisted, perhaps by rolling the fiber or yarns with the palm of the hand up or down the thigh. The other string fragments seemed to be made of bast fiber, probably *Hechtia*. No *Hechtia* was found in the cave,

so it seems likely that the string was manufactured elsewhere, or else our identification of *Hechtia* was wrong. One 2-ply Z-twisted cord composed of loosely-twisted S-twist yarns of bast fiber was tied in a square-knot to form four loops. The 2-ply Z-twisted cord of medium-thick diameter in the textile mentioned above and discussed below seemed to have been handmade. Some of the textile's 2-ply S-twisted cords, however, were made of Z-twisted yarns of fine bast fibers twisted tightly enough and spaced evenly enough to indicate that they were spun with a spindle whorl. A sherd disk was found near them. Also, a square-knot was formed by two strands of bark cloth about 2 cm. wide. This was probably the tie in the ankle-strap of the same kind of small ceremonial baby sandal found in other caves. Making bark cloth is, of course, an entirely different process, and we shall deal with it when we discuss the occupation of Zone C when it had become a major activity.

Some of the cords mentioned above were part of a loom-woven textile (Specimen 13), probably some sort of sash no more than 6 cm. wide (see Volume 2, page 220). Fine bast cords spun with a spindle whorl composed the warp cords in a belt loom. Cords of this type, and Z-twisted cords of coarser bast and *Agave* fibers, had been woven over-one-under-one to form the weft. This plain cloth was very tightly woven; a small heddle was probably employed. We cannot be certain that this textile was woven in the cave, although we found what might have been a piece of a loom stick.

The Baby Face figurine found showed a sash, such as the textile uncovered, worn around the waist. The length of the sash seemed to indicate that it hung down the front between the legs. The figurine also showed a skull cap extended down over the back of the neck and over the ears with some sort of earplugs. The other figurine fragment, a Plain Frock type, showed a long sack-like dress which hung down to the feet without any sort of differentiation or belt at the waist area. These plain frocks worn by the women could have been made by a series of belt-loom sashes sewn together at the sides. Sandals with ankle straps tied into a loop in the front, and a necklace of green spherical beads might have completed a typical costume.

Pottery-making was a big industry at that time period and was represented by hundreds of specimens in both the east and west niches. Table 2 is one way of illustrating the range and variety of pottery types found and the vessels they represented, all probably made elsewhere.

TABLE 2
Ceramic Remains of Layer 3-4 and Zone E of Tc 35

Minimum No. of Vessels (by pottery type)	West Niche Layer 3-4	East Niche Zone E
Quachilco Gray sherds		1
Quachilco Brown sherds		8
bowls		3
El Riego Gray sherds	43	101
outflaring-rim bowls	2	6
ollas (spout and handle)		1
El Riego Orange sherds	69	258
hemispherical bowls	2	3
incurved-rim bowls	1	1
outflaring-rim bowls		3
cylindrical bowls		2
short-neck ollas		1
Quachilco Mica sherds	16	103
long flaring-neck ollas		1
long flaring-neck ollas w. flaring rim		1
funnel-neck ollas		1
short flaring-neck ollas		1
El Riego Plain sherds	7	75
hemispherical bowls		1
long flaring-neck ollas		2
El Riego Marble-tempered sherds	1	13
comal		1
El Riego Polished sherds	7	44
incurved-rim bowls	1	1
Thin Orange sherds	5	14
ring-based conoidal bowls	1	1
El Riego Black sherds	5	13
outflaring-rim bowls		1
Coxcatlan Brushed sherds	1	2
San Martin Stamped sherds	1	
San Martin Incised sherds	1	
Texcoco Fabric-impressed sherds	2	

We have from several other sources some hints of a major ceremonial activity. A number of charred human bones had been deposited in both the east and west niches. In the east niche, in Activity Area 5 (N3E1, N2E1), were the charred skull, vertebrae, and rib fragments of at least one adult. There seemed to be no actual burial pit nor any artifacts which may be said to have been directly associated with the burial, except for the one fragment of a figurine head that was surrounded by three charred skull fragments in the northwest corner of Square N2E1. The other figurine head fragment was found in a pit in E3 with plant remains. The carved nut and the tied bark cloth from N3E1 also might have had ceremonial significance. The human remains from the west niche came from two areas. Burial 2, consisting of burned bones that included parts of the skull, teeth, long bones, ribs,

ACTIVITY AREAS

Activity Area 1

Tool Kit - meat preparation

- 3 flake choppers
- 6 ellipsoidal choppers
- 21 antler, white-tailed deer
- 26 radius, white-tailed deer
- 27 ulna, white-tailed deer
- 28 innominate, white-tailed deer
- 29 femur, white-tailed deer
- 34 metapodial, white-tailed deer
- 35 phalanx, white-tailed deer
- 36 vertebra, white-tailed deer
- 37 rib, white-tailed deer
- 40 foetus, white-tailed deer
- 41 maxilla, peccary
- 48 other, peccary
- 60 maxilla, cottontail
- 61 ramus, cottontail
- 62 humerus, cottontail
- 65 innominate, cottontail
- 66 femur, cottontail
- 67 tibia, cottontail
- 68 metapodial, cottontail
- 69 phalanx, cottontail
- 70 fragments, jackrabbit
- 79 fragments, opossum
- 81 fragments, gopher
- 824 scapula, domestic dog
- 825 humerus, domestic dog
- 826 ulna, domestic dog
- 827 innominate, domestic dog
- 828 femur, domestic dog
- 829 tibia, domestic dog
- 8213 metapodial, domestic dog
- 8214 phalanx, domestic dog
- 8215 snake

D number of unidentified bone fragments per square

Tool Kit - seed preparation

- 8 tecomate bowls
- 16 metate fragments
- 29 rectangular tripod metates
- 31 cylindrical manos
- 4 grass quids
- 5 zea mays (maize)

Tool Kit - flint knapping

- 2 fine blade fragments
- 8 fine blade with unprepared platform
- 9 fine blade, snapped, two edges worked
- 1 worked antlers or bone
- 4 domed scraper plane

Activity Area 2 - weaving and string making

Tool Kit

- 45 spindle whorls
- 1 polished loom sticks
- 4 small pointed sticks
- 5 large pointed sticks
- 18 pounded stick
- 25 rectangular loom sticks
- 1 plain weave textiles
- 5 S twist fine agave cord
- 6 Z twist fine agave cord
- 7 Z twist thick agave cord
- 14 Z twist cotton yarn
- 18 Z twist bast 3-ply yarn
- 20 Z twist cotton cord
- 21 S twist cotton cord
- 1 overhand knot in agave fiber
- 2 overhand knot in bast fiber
- 9 square knot in bark cloth
- 51 ball of spun and unspun maguey fiber
- 54 agave spp. quids
- 55 agave spp. leaves

Activity Area 3 - burial

- D I adult male scattered bones

Activity Area 4 - burial

- D II adult female - bone fragments
- D III newborn infant - bone fragments



Fig. 13. Burial 4-1 in Layer 3-4 of Tc 35w.

and vertebrae of an eleven-year-old child, occurred in Squares N4W4, N5W4, and N5W5 (Area 3). Some of the black crystalline accretions on the bone contained specks of hematite, and nodules of hematite occurred in Square N5W5 with the bones. Again, two beads were found in Square N5W4, but whether they were with the skeleton or not is difficult to determine. The other bones, charred limb and skull fragments of an adult burial (No. 1), were in Squares N4W8, N4W9, and N4W10 (Activity Area 2). Probably associated were two bowls of El Riego Orange in N4W8 and a muller, a mortar containing hematite paint, and chunks of hematite in Square N4W10 (Fig. 13). All in all, there is considerable evidence of burial rites and ceremonies as well as artifacts with ritual significance during these occupations.

The pottery types, blade types, and many of the other artifacts indicate that the occupations of Zone E-F of Tc 35e and Layer 3-4 of Tc 35w took place during Late Palo Blanco times, roughly from 300 to 500 A.D.

The Way of Life of Zone D

Overlying the ash of Zone E-F in the northeast sec-

OTHER ARTIFACTS

Blades

- 6 fine with unprepared platforms

End Scrapers (terminally worked unifaces)

- 1 scraper plane fragments
- 3 crude, long flat-flake
- 8 thin-flake
- 9 crude discoids

Laterally-worked Unifaces

- 4 thick flake, one edge retouched

Projectile Points

- 23 Palmillas
- 25 Tehuacan

Other Bilaces

- 4 blocky-core choppers

Bone

- 2 split bone awl
- 14 rib pendant

Wooden Artifacts

- 27 distal end cane arrow mainshaft

Knots, Coils, and Strands

- 50 balls of hard fibers, spun or unspun

Botanical

- 6 acrocomia mexicana (coyol)
- 7 amaranthus spp.
- 8 persea americana (avocado)
- 18 P. vulgaris (common bean)
- 22 casimiroa edulis (white bean)
- 30 ceiba parvifolia (pochote) pods
- 35 L. stellatus fruit
- 38 opuntia spp. leaves
- 40 opuntia spp. fruit
- 44 diospyros digyna (black sapote)
- 47 crescentia cujete (tree gourd)
- 48 unidentified cucurbita spp.
- 49 C. mixta
- 50 C. moschata
- 51 C. pepo
- 52 lagenaria siceraria (bottle gourd)
- 68 gossypium hirsutum (cotton)

Ceramics

- 39 Teotihuacan

C

- number of incense burner fragments

Flakes

- number of sherds per square

F

- number of flakes per square

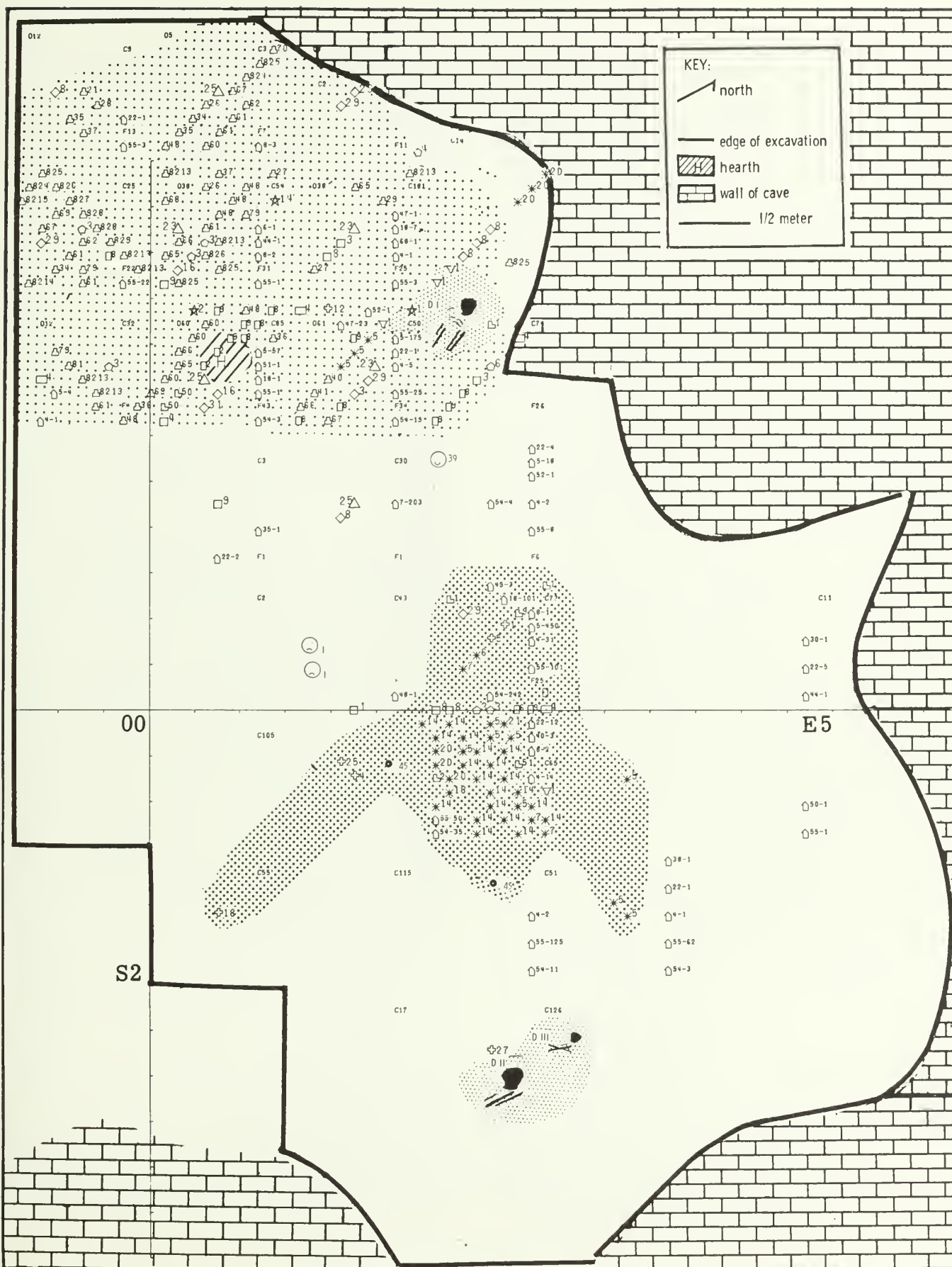


Fig. 14. Activity areas of Zone D of Tc 35e (above) with key to their ecofacts and artifacts (left).

tion of the cast niche and filling up many of the pits and depressions in the center of the cave was a powdery-gray to light-brown zone ranging from 10 to 50 cm. thick. The surface of this layer was relatively level and was capped by a darker burned stratum, or floor, about 10 cm. thick. These two strata composed Zone D (Fig. 14). The zone extended over about 16 to 18 square meters from N4 to S3E3. Although the whole surface was heavily burned, only in Square S2E1 where some fire-cracked rock was uncovered could we discern a hearth area. Certainly the whole zone could not have been deposited by any group larger than a microband. The plants and animal bones suggest a year-round occupation, and the thickness of the lower gray-to-brown member of the zone suggests a number of occupations. Most of the artifacts and refuse, however, occurred in the dark burned floor of the zone, suggesting that most of the occupation occurred over a brief time span. On the basis of this information, we have concluded that Zone D was deposited by a small group of people who visited the cave spasmodically throughout the year, perhaps for a brief number of years.

Evidence of their subsistence comes from two sets of data: numerous preserved plant and animal remains, and nine feces, two of which, Nos. 46 and 48, were considered to be from animals. The animal bones reveal that about 60.3 liters, or 52 percent of the total estimated food, came from meat, mainly deer and some rabbits and other animals. Calculation based on preserved vegetal foods indicates that about 39 percent of the food came from domesticated plants (predominantly corn) and 8 percent from wild plants (predominantly *Agave*). The importance of meat is borne out by the estimates based on the feces. Meat remains were present in 8 out of the 9 coprolites, predominant in 4; however, wild plant foods seemed almost as important as meat. *Agave* remains were present in 5 specimens, predominant in 4, along with seeds, predominant in 2, *Opuntia* predominant in 1, and *Compositae* present in 2. Further, the wild plant particles were much more prevalent than maize or chili peppers, present only in 4 specimens. This may have been due to the tough fiber of maguey, cactus, and hard seeds which are less likely to disintegrate during digestion. Corn was probably fine ground for tortillas or stew and thus not readily discernible in the feces. Therefore we believe that the estimates from the bones and vegetal remains are probably nearer the correct proportion, but we also want to observe that this is an all-year estimate of a diet which undoubtedly varied considerably with the seasons.

We also believe we have some basis for estimating other subsistence activities during the occupation of Zone D. Bones of at least two deer and one peccary and deer hair in the feces were found in association with projectile points of atlatl size, an atlatl foreshaft, and an arrow mainshaft. This suggests two hunting methods: stalking with atlatl darts and rapid-fire shooting with bow and arrow. The rabbit, opossum, and gopher bones in association with a bast fiber strand tied in an overhand knot may indicate trapping. Dog bones, some of which were charred, suggest that at least this one type of domesticate was kept for eating. The *Agave* and *Opuntia* leaves suggest leaf-cutting; wild *Cucurbita*, *Opuntia* fruit, pochote, *Acacia*, and guaje pods may indicate fruit and pod-picking; and grass quids, *Dioon edule*, and squash seeds were evidently collected. Evidence for agricultural activities was much more complex and speculative. The coyol, chupandilla, white and black sapote, and avocado fruit were grown, perhaps in orchards, while the squash, pumpkins, gourds, and perhaps chili peppers suggested some sort of horticulture or gardening. The beans, amaranth, and corn could have been grown by either barranca or irrigation agriculture, probably the latter technique. Fossil irrigation ditches are present in the El Riego area, and we know these were functioning at this time.

Evidence for food preparation was perhaps better than that for the above-mentioned aspects of the subsistence. It appears that deer were initially butchered outside the cave, and that only the limb bones were brought in for food: 10 of the 14 identifiable animal bones were from limbs. This seemed to be true of the dogs as well. All parts of the rabbits but the skulls were brought back to the cave, while the limited number of peccary bones suggest that it was the head rather than the body that was brought into the cave. Some of the larger mammal bones were smashed in the northwest section of the cave (Activity Area 1), perhaps for marrow. A few of the bones were burned, so at least some of the meat was roasted. The presence of the majority of the chopping stone tools (30 out of 46) in association with most of the bones (350 out of 400) suggest that it was this same area where the meat was prepared (cut up) for cooking and eating. Some of the *Agave* and *Opuntia* leaves, as well as glumes of about forty corn cobs, showed charred sections. Probably wild plants were roasted on the rock-filled hearth in Square S2E1 near their major concentration of *Agave*, *Opuntia*, and corn in Squares E3, S1E3, and S2E3. Of course, a considerable number of fruits and other plant foods were probably eaten raw,

as indicated by the 328 *Agave* quids, 52 grass quids, and 2 chewed corn cobs. Some seeds, such as amaranth, chili pepper, and grass, were probably ground into flour by the three cuboid pestles and one muller on the two milling stones. Many (about 100) of the corn cobs had cut glumes. These were associated with two cuboid manos, a stave-shaped mano, and parts of five tripod metates and five comales. This suggests tortillas were made. Most of these objects appeared in Activity Area 1. Ten bowls (2 flaring-rim bowls of El Riego Gray, 2 hemispherical and 1 in-curved-rim bowl of El Riego Orange, 1 hemispherical and 3 flaring-rim bowls of El Riego Black, and 1 hemispherical bowl of El Riego Plain) and nine ollas (4 of El Riego Plain and 5 of Quachilco Mica) showed adhering carbon. These vessels were probably used to cook any of the prepared foodstuffs. The other 40 bowls, 5 jars, and 7 ollas could have been used for storage or for soaking such foods as the 109 beans found. One pit-like area, which may have been used for storage, was found in E3, the square with the greatest concentration of plant foods.

Flint knapping was one of the most important activities in Zone D. Like the bones and chipped stone tools, most of the flint chips and cores (183 out of 241) were found in the northeast section of the east niche, indicating where this industry was performed (Activity Area 1). The majority of materials utilized was from a block of El Riego chert (121 chips); 26 of these had been roasted pink to give them a more glass-like fracture. There were also 36 chips from pebbles, probably local, 32 obsidian chips, 37 caramel-colored flints, and 32 basalt chips, all of which may have been imported. The majority of the tools seemed to have been made from blocky cores which had prepared (19 pointed and 16 unpointed) striking platforms; a few (4) were unprepared. The majority of the flakes with platforms (21 out of 38) seemed to have been struck from the cores by blows with a hammer softer than stone or by indirect percussion, although we did find 3 pebble hammers. A few of the tools, such as the 2 blocky cores, 1 spherical and 1 discoidal chopper, 3 discoidal scrapers, and 2 scraper-planes, were probably made from blocky cores or pebble cores by a few well-placed blows struck by percussion. The 4 side-scrapers and 5 end-scrapers were made into tools by unifacial pressure flaking, perhaps with the cut antler tool found in Square N2E2. The 6 projectile points were also made from flakes, but they were pressure-retouched bifacially, and there was no evidence that they prepared the platform by grinding any edge.

The imported obsidian seemed to have been worked by other techniques. Seven blades indicated that blocks of obsidian were made by percussion or indirect percussion initially to form bullet-shaped nuclei with parallel flutes. The blades were then struck off. One chip with an unworked platform indicated that direct percussion was rarely used, while 3 chips with ground platforms indicated some blades were removed by impulsive pressure flaking. Eight of these blades then had their proximal striking platforms and curved distal ends snapped off to form flat rectangles whose longer lateral edges were then retouched. Three of these showed scratching on one edge, an indication that at least these 3 had been inserted into handles.

Most of the ground stone tools (except the muller, milling stones, and hammers) were made from volcanic tufa. We suspect that these tools were imported. Volcanic tufa is not local, and we found no chips of it in the refuse. The other 4 tools were probably ground out locally. A rib pendant and a split-bone awl were also locally ground into shape. The bone awl may have served as a weaving pick.

Skin-scraping also took place in the northeast sector. A fragment of fur of a white-tailed deer (facetiously recorded as "pelo de Cristiano" by a dark-haired Mexican) was uncovered in Square N1E1. Four of the 5 end-scrapers, most of the side-scrapers, and the bone awl occurred in that activity area, as did one of the scraper-planes and discoidal scrapers. The piece of skin was impregnated by carbon; whether this was a result of curing by smoking or from the refuse could not be determined.

A number of wood tools were evidence of still another activity during the occupants' stay. A piece of cane had been sawed to make an arrow mainshaft. Two fragments of a gourd had been cut (to make a container?). Of the 251 small sticks uncovered, 38 had been shaved to remove their bark and one of them had been whittled to a point. Four other sticks which had been shaved and whittled to a point were further worked, one into an atlatl foreshaft and three polished into long conical stakes. (One of these had been pounded.) One large stick, almost a log as it was 14 cm. in diameter, had been chopped to a point by adz blows struck round and round its circumference. The other tool uncovered was a rectangular loom stick or sword, and it had been made from an even larger log. Initially a long shaving about 1 cm. thick had been separated from the log by adz blows or by a wedge being struck by a hammer. Then the shaving was formed into a rectangle by blows with an adz. Its surfaces were then polished and finally a hole was

drilled midway along one side near its edge by a hand drill twirled on two opposite surfaces. Although none of the chipped stone tools were recognizable as wood-working tools, some of them might have served as such; others may have been taken away by the cave-dwellers when they left.

It seems there was no specific woodworking area, although a number of wooden tools did occur in the southern half of the cave. These tools, however, seemed to have been utilized in another industry—string-making and weaving. *Agave* leaves and quids, the basic ingredients for making coarse cord or yarn, were distributed all over the floor with the greatest concentration in the southeastern sector (Activity Area 2). Three loops made from leaves and tied in a square knot were possibly carrying loops. *Agave* cords were more numerous, all 13 had S-twisted yarns, 12 of two yarns and 1 of three yarns. Most (7) of them occurred in Square S1E3 along with some *Agave* wrapped in a ball and other leaves wrapped around a stick, which could have served as a bobbin or shuttle in weaving. Three bast fiber cords (possibly from shredded bark or *Yucca* leaves) with Z-twisted yarn and a bast fiber strand tied in an overhand knot appeared in the southern activity area of the cave. There were also 6 pieces of cotton cord with S-twisted yarn; 3 were in the same area. The other 3, probably part of a fabric, were with a burial in N3E3. All of this string was handmade; that is, most of it was rolled by the palm of the hand.

Other yarn, mainly cotton, included the bast yarn of the textile plain weave Specimen 14. These were sufficiently fine and tightly twisted to suggest the textile was spun with spindle whorls (2 sherd disks). Many of the yarns were Z-twisted; a few of bast and cotton in Textile 17 were S-twisted. Perhaps we had both left-handers and right-handers making yarn. About 20 yarns and one piece of cotton cord occurred in Square S1E3, while two sherd disks, probably spindle whorls, occurred nearby in Squares S1E2 and S2E3. Also, in S1E2, one of the small pointed sticks could have been a spindle. Cotton fibers, seeds, and a cotton pod occurred not in this area, but rather in Squares N2E2, N3E3, and N3E2 respectively, and some cotton fibers were noted in Square N1E3. This spindle whorl-made yarn, for the most part, seemed to have been spun for use in making textiles.

That the inhabitants did in fact weave in this southern sector is suggested by a shuttle found in S1E3 and another rectangular stick or shuttle found in Square S1E2. The latter may have also served as a sword.

Further, in Square E3, two sticks were classified as polished sticks. The more complete fragment, broken on both ends and about 4 cm. in diameter and over 10 cm. in length, without any bark, was recorded in the notes as *polido a uno lado*, "polished on one side." The polish extended the entire length of the stick, covering about half its circumference, with the greatest luster extended along the middle of the polished surface. This, we believe, was due to the rubbing of a soft material which had been wrapped over half the stick. This material was the warp strands of a belt or back strap loom and we believe the stick was the warp beam of a back strap loom. What the other associated round stick and polished stick were could not be determined, but we suspect they were also somehow connected with string-making or weaving. The four textiles (Nos. 14, 15, 16, and 17) (three probably associated with Burial 1 in Square N3E3 and the other represented by eight fragments in the southern section) gave us some idea of their weaving techniques.

In Specimen 14 the warp of the belt loom was made of two sets of Z-twisted 2-ply bast S-twisted yarns, one dyed blue and the other pale brown. There seemed to have been about 100 blue warps, making a 3-cm.-wide blue stripe followed by a similar stripe composed of warps of non-color yarns. Weft cords, similar to the undyed warp cords, were woven through the warp stripes, over-one-under-one. In finishing up the end of this mantle or wide belt, they used a rather special technique for tying off the warps. Here they made about 16 to 18 strands of weft-twining with a hard fiber cordage, with the first four rows of regular single-weft twining, and the final three rows double wefts in the twining. Later they either mended or reinforced the sides by rolling them under and hemming them.

The other cloths were made with cotton yarns with an over-one-under-one weave on a belt loom. No. 15 was fine woven with Z-twisted warp and weft yarns of about the same size, while No. 17 was finely woven with S-twisted weft and warp yarns. No. 16 was more loosely woven with the Z-twisted warp yarns slightly thicker than the Z-twisted weft yarns. All of these textiles are discussed in Part IV, Vol. 2.

Also associated with the textiles were two pieces of bark cloth tied together by an overhand knot. Although some fragments of bark were found in the refuse, we believe the bark cloth was not made in the cave but rather brought in for ceremonial purposes. Here again is evidence of considerable ceremonial activities during the occupation of Zone D.

In Square N3E3 (Activity Area 3) there were the

remains, mainly skull fragments, teeth, and long bones, of an adult male (D:1) (cf. Vol. 1 of this series, Chap. 6). Associated with the burial were three fragments of textiles (Nos. 15, 16, and 17) which we believe had been wrapped around it. Since the leg bones were in alignment with each other as well as with the skull, we suspect that this had once been a burial extended on its back on the floor of the cave and wrapped in textiles that had later been disturbed by pitting from Zone B. A small fragment of a mold-made figurine, probably a Tlaloc type, was found in the adjacent Square N2E3; also in N4E2 were two foot fragments of a large gray incense burner and a whole pot and burned bones. Whether or not they were associated with the burial could not be determined. In Square S3E3 (Activity Area 4) were the bones, mainly jaw, teeth, and a few skull fragments, of an adult female (DII), along with skull bones of a newborn infant (DIII). These were probably connected with ceremonial activities, as was perhaps the bird effigy whistle found.

The other items that were distributed profusely through all the levels were potsherds, an obvious indication of a ceramic industry probably undertaken by these Late Palo Blanco people outside the cave. These ceramic receptacles included about 40 bowls (10 had been cooked in), 5 jars, 25 ollas (9 had been cooked in), and 4 comales (3 El Riego Marble-tempered and 1 El Riego Gray) on which tortillas were cooked. One flaring-rim bowl was Quachilco Brown, 7 were El Riego Gray, and 5 were of El Riego Black. There was also a hemispherical bowl of El Riego Plain, 2 of El Riego Polished, 3 of El Riego Black, 4 of El Riego Orange, 8 of Thin Orange, 1 of San Martin Stamped, and 1 of Red-on-orange; also, a cylindrical jar of El Riego Orange, 1 of El Riego Black, and 3 of El Riego Gray. Also uncovered were parts of an outslipping-rim bowl of El Riego Gray, 4 incurved-rim bowls of El Riego Orange, and 1 of El Riego Black. A strap handle indicates some sort of olla of El Riego Gray. Three long-flaring-neck ollas of El Riego Orange and 2 of El Riego Plain, and 2 short-neck ollas of El Riego Black and 3 of Quachilco Mica were dug up; also two funnel-neck ollas of Quachilco Mica and one of El Riego Polished, and a straight-neck and an angled-neck olla of El Riego Plain. Needless to say, these vessels for cooking, storage, eating, and carrying purposes were made outside the cave and brought in for use.

The sherd types and the other artifacts indicate that Zone D be considered a Palo Blanco component. The proportions of sherds indicate that the occupation or

occupations took place in the general time period between about 550 and 700 A.D.

The Way of Life of Zone C

Zone C overlay Zone D in the east niche. The relative difference in the proportions of ceramics in Zone C in the east niche and in those of the earliest Post-classic ceramics of the west niche indicate that the occupation was confined to the east niche. The area of the zone was about 21 square meters and, where there were no pits, the zone was covered by sand 20 cm. thick. The stratum itself was brown in color and composed of powdery disintegrated vegetal remains and ash. The size of the refuse area suggests an occupation by a small group of people, and from the bones and plant remains and the thickness of the strata we would say that the occupation (or occupations) occurred all year round, probably for a number of years. Seven pits were dug down from the stratum. Two huge pits (over 2 meters in diameter and as much as a meter deep) were apparently cache pits for both food and artifacts, and three small pits were for storage or roasting. A stucco-lined pit (see Fig. 7) apparently was used for soaking bark cloth, and bones were found in Pit 4. These pits are all suggestive of and pertinent to the way of life of the occupants and will be discussed further.

The bones, plant remains, and content of the feces allow us to determine what their diet was and to estimate amounts. Only 22 percent of the total was meat and an even lesser 6 percent came from wild plants. The dominant part of their diet (72 percent) was agricultural produce. Domesticated dog (2) and turkey (3) were part of their diet, as were wild deer (2) and peccary that may have been hunted down by arrows or atlatl darts. We found one cane shaft that perhaps was tipped by one of the Tula (2), Teotihuacan (2), or Matamoros points, and one slotted foreshaft, perhaps tipped by one of the Morhiss, Ensor, Tehuacan (3), Palmillas (2), Salado (2), or Abasolo points found. Rabbits (8), opossum, and gophers may have been caught in snares. We did find a slip knot on an *Agave* fiber that could have been part of such an implement. The lizards (3) and turtle were probably simply collected. Eight of the feces showed a somewhat similar picture (cf. Vol. 1, Chap. 14). However, one definitely human coprolite, Cop. 94, and the one possibly human, Cop. 70, had no meat in them at all.

Agave quids represented 11.9 liters of the wild plants found in the refuse. *Opuntia* leaves or stems and grass were further evidence of a leaf-cutting activity. Fruits

and pods of *Opuntia*, pochote, mesquite, and *Acacia* were also present, and there were about 16 ounces of *Acacia* seeds. Again, the feces revealed a similar picture. Seven coprolites contained *Agave* fibers, one contained mesquite pod fibers, and four, cactus fibers. They also contained a few seeds of *Setaria*, *Acacia*, and *Compositae*. All of these could have been cut or plucked in the region immediately in front of the cave.

The dominant part of their diet (72 percent) seemed to have come from agricultural produce, and perhaps at that time even *Agave* and *Opuntia* leaves (normally wild) were under cultivation. Corn was particularly numerous; it could have been grown in nearby irrigated fields along with chili peppers, amaranth, gourd, pumpkin, and runner, lima, and common beans. Corn, beans, *Cucurbita*, and chili peppers were present in the feces. The refuse yielded a few fruit remains which were not discernible in the feces. Avocado, black and white sapotes, chupandilla, cosahuico, coyol, and ciruela could have been either gathered from irrigated orchards or plucked from individual plants. The sugar in these fruits may have been partly responsible for the caries in the teeth of the female burial.

Evidence concerning food preparation was not overwhelming. The older technique of roasting seemed to have gone out of style; no hearth of fire-cracked rock was found. Only one corn cob was charred and, of the 96 identified bones and 333 unidentified fragments, only 3 were charred. None of the snail (4) or mollusk shells (4) showed evidence of roasting. A more popular method of cooking food seems to have been boiling. Six of the 14 ollas (Cf. Vol. 3 *passim*) and one hemispherical bowl had interior adhering carbon. The other 7 ollas, 22 bowls, and a gourd vessel were probably used for storage, water hauling, or as eating vessels. Tortilla grilling was probably a major part of their cooking activity. We uncovered 16 corn cobs with cut glumes where the kernels had been removed. Three mullers, a cuboid mano, a stave-shaped mano, and a spherical mano were used for grinding the kernels into meal on the milling stone; and a metate and fragments of at least ten comales roasted the prepared meal. The teeth of the female burial had been ground to the bone from chewing on food impregnated with a gritty material, i.e., corn with the grit from the grinding stone. The one incised bottom fragment of Coxcatlan Brushed was probably part of a molcayete used for grinding up chili pepper or other seed remains; the muller and milling stones could have had a similar function.

Cotton was probably grown in the well-watered fields nearby at the base of the El Riego cliffs. This agricultural activity was an important part of their

ACTIVITY AREAS

Activity Area 1 - weaving and string making

Tool Kit	
● 45	spindle whorls
⊕ 1	polished loom stick
⊕ 18	pounded stick
⊕ 23	comb of tied sticks
★ 8	oone awl or weaving pick
▽ 1	plain weave textiles
▽ 2	semi basket weave textiles
▽ 3	basket weave textiles
▽ 4	welt weave cording
▽ 30	split stitch basket
▽ 42	petate with sewn selvage
✱ 6	Z twist fine agave cord
✱ 7	Z twist thick agave cord
✱ 12	Z twist thick bast yarn
✱ 14	Z twist cotton yarn
✱ 18	Z twist bast 3-ply yarn
⬆ 68	cotton fibers

Activity Area 2 - cremations

⬆ 1	adult female - burned skull and other bones
⬆ 2	under two years infant - bone fragments

Activity Area 3 - weaving and string making

Tool Kit	
● 45	spindle whorls
⊕ 2	cut loom logs
★ 22	bone effigy pendant or weaving pick
▽ 1	plain weave textiles
▽ 2	semi basket weave textiles
▽ 4	welt weave cording
▽ 41	petate, no selvage
▽ 40	petate
✱ 6	Z twist fine agave cord
✱ 7	Z twist thick agave cord
✱ 8	S twist thick bast cord
✱ 12	Z twist thick bast yarn
✱ 14	Z twist cotton yarn
✱ 15	S twist cotton yarn
✱ 18	Z twist bast 3-ply cord
⬆ 68	cotton fibers

Activity Area 4 - bark cloth manufacture

Tool Kit	
⊕ 28	rackel type bark beater
▽ 50	bark cloth fragments
⬆ 9	square knot in bark cloth
⬆ 67	Cissus spp. bark

OTHER ARTIFACTS

Blades		Projectile Points	
□ 1	crude fragments	△ 1	tip
□ 2	fine fragments	△ 2	bodies
□ 5	crude with pointed platforms	△ 2	Abasolo
□ 6	fine with unprepared platforms	△ 22	Salado
□ 8	fine with pointed platforms	△ 23	Palmillas
□ 9	fine, snapped, two edges worked	△ 24	Matamoros
□ 10	fine with ground platforms	△ 25	Tehuacan
End Scrapers (terminally worked unifaces)		△ 26	Ensor
□ 1	scraper plane fragments	△ 27	Morhiss
□ 3	crude, long flat-flake	△ 28	Tehuacan
□ 4	domed scraper planes	△ 29	Tula
□ 5	flat-topped scraper planes	Other Bifaces	
□ 6	multi-faceted scraper planes	⊕ 1	chopper fragments
□ 7	gouges	⊕ 2	flake choppers
□ 9	crude discoidals	⊕ 3	blocky-core choppers
□ 11	fine, flat-topped	⊕ 5	ellipsoidal choppers
Laterally-worked Unifaces		⊕ 13	large disks
□ 10	thin, one edge retouched	Bone	
Ground Stone		★ 12	bird-bone bead
⊕ 16	metate fragments	Wooden Artifacts	
⊕ 17	ovoid mullers	⊕ 8	cut gourds
⊕ 20	spherical manos	⊕ 15	carved nubs or seeds
⊕ 29	rectangular tripod metates	⊕ 16	all-leaf foreshafts
⊕ 30	cuboid manos	⊕ 2	cane tubes
⊕ 31	stave-shaped manos	⊕ 26	proximal cane arrowshafts
⊕ 36	polished pebbles	⊕ 29	painted wood
⊕ 39	stone pendants	⊕ 30	whittled plug
⊕ 42	pebble hammers	⊕ 31	ciruela seed tinkler
Knots, Coils and Strands		Ceramics	
⊕ 1	overhand knot of agave fibers	⊕ 41	Totlec figurine
⊕ 11	overhand knot of corn leaves	⊕	number of Xantile fragments per square
⊕ 16	slipknot of agave strands	⊕	number of sherds per square
⊕ 23	two half hitches of bark	⊕	number of flakes per square
⊕ 35	square knot of corn leaves	⊕	
⊕ 54	leather strands	⊕	

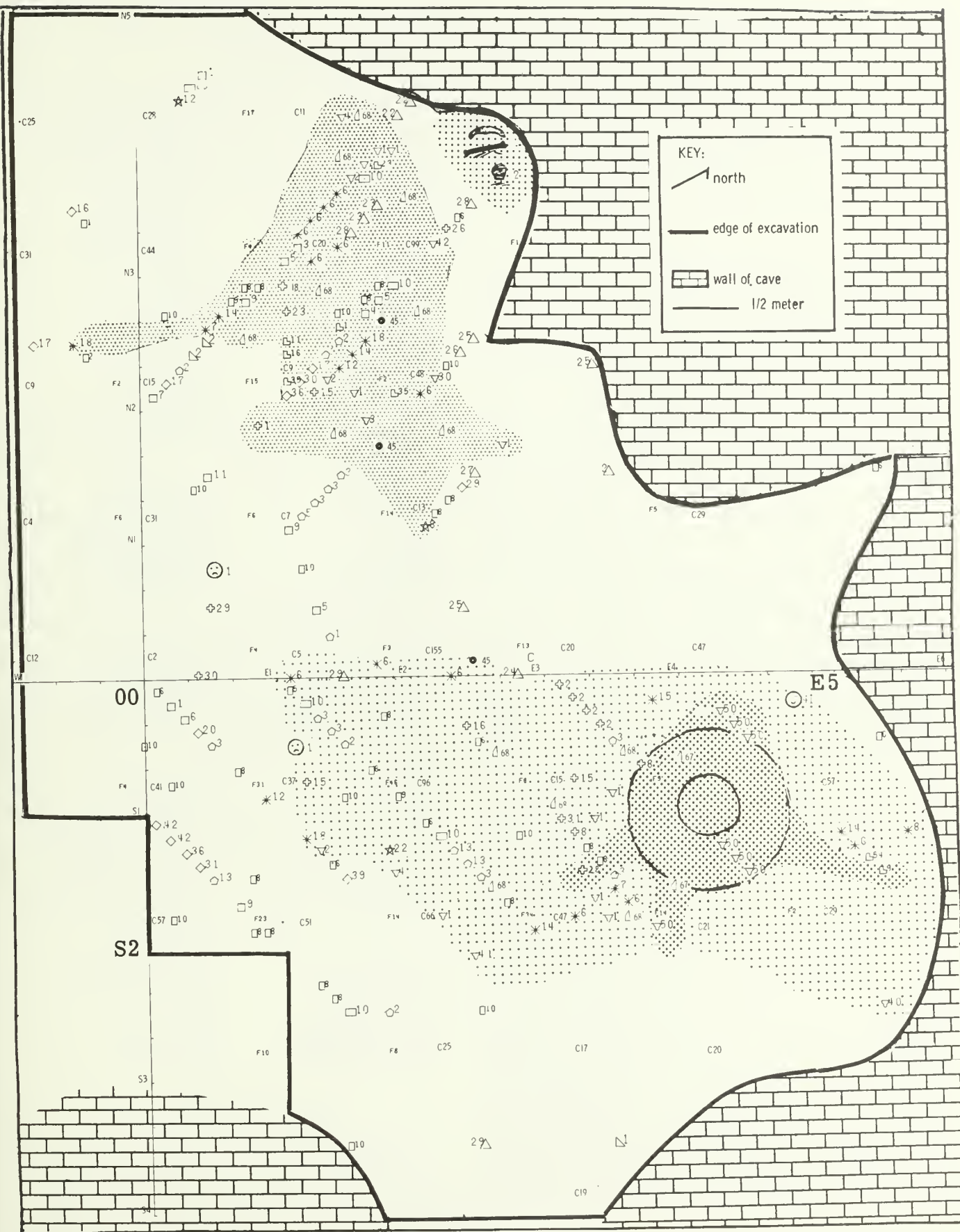


Fig. 15. Activity areas of Zone C of Tc 35e (above) with key to their ecofacts and artifacts (left).

living. The cotton textiles, cotton fibers, yarn, string cord, and other implements connected with weaving and string-making occurred in five square meters of the north-central part of the zone (Activity Area 1) and in six square meters in the southeast part of the deposit, Activity Area 3 (see Fig. 15). It is highly probable, then, that string-making and weaving occurred only in these two areas, and that some of the associated objects found therein composed their tool kits.

In both areas string was made by roughly the same methods. One method was by hand using *Agave* fiber or bast (pochote?) fibers. These fibers were probably chewed to soften them before they were rolled into string. In both Activity Areas 1 and 3 the same kinds of yarn were probably made in the same manner; that is, by rolling the chewed fibers of bast or *Agave* up the thigh with the palm of the right hand to form S-twisted yarn or down the thigh with the right palm to form Z-twisted yarn (or vice versa if the string worker was left-handed). We found cord containing both types of yarn in both areas. Someone even made a piece of S-twisted cotton yarn by this method, in the southern activity area. Most cotton fiber, however, was spun into Z-twisted yarn by a spindle whorl; these were found in both activity areas. This kind of yarn was the sort that was usually used in weaving the textiles; the bast and *Agave* yarns were often twisted into various kinds of cords by hand. In both the north and south activity areas some cord was made by taking two or three S-twisted *Agave* yarns and rolling them down the thigh with the right palm to form two- or three-ply Z-twisted cord. In the south activity area there was one example that showed that Z-twisted yarns were rolled up the thigh to make S-twisted cord. In the north area some strands were tied by overhand knots, slip knots, square knots, and half hitches, probably for a variety of purposes. Still, the primary purpose for making string or yarn of either bast or cotton fibers in both areas seems to have been to obtain elements for weaving textiles. Five specimens of one-over-one closely spaced warp face cloth with cotton warp and weft yarns occurred in the southern activity area. All were woven on the same close warp type of belt loom, although they are assuredly three different textiles. With the exception of a cut stick and an effigy bone pin (which could have served as a weaving pick), no weaving tools were really associated with these cotton objects in the southern area. In the northern area in two squares were five textiles, all one-over-one belt loom-woven from S-twist non-cotton yarns. Two similar pieces occurred in the southern area. In the northern

Pit 1 ~~~~~
 5 zea mays (maize)

Pit 2 -----
 5 zea mays (maize)
 6 acrocomia mexicana (coyol)
 7 amaranthus spp.
 8 persea americana (avocado)
 10 acacia spp. seeds
 18 p. vulgaris (common bean)
 21 prosopis juliflora guids (mesquite)
 22 casimiroa edulis (white bean)
 26 cyrtocarpa procera (chupandilla)
 30 ceiba parvifolia pods (pochote)
 31 cephalocereus hoppenstedtii (tetecho)
 38 opuntia spp. leaves (prickly pear)
 40 opuntia spp. fruit (prickly pear)
 44 diospyros digyna (black sapote)
 45 capsicum annuum (chili pepper)
 47 crescentia cujele (tree gourd)
 48 unidentified cucurbita spp. (squashes and pumpkins)
 51 c. pepo
 52 lagenaria siceraria (bottle gourd)
 54 agave spp. quids
 55 agave spp. leaves
 58 yucca periculosa leaves
 60 brahea dulcis (palm)
 63 tillandsia spp. spikes
 65 beaucarnea gracilis (sotolin)
 70 grasses (unidentified)
 82 bark
 83 wood
 3E phalanx, white-tailed deer
 41 maxilla, peccary
 6A other, cottontail
 6C tibia, cottontail
 6E innominate, cottontail
 6J maxilla, cottontail
 16A fragment, opossum
 19C vertebra, dog
 19E metapodial, dog
 19H tibia, dog
 19K ulna, dog
 19O ramus, dog
 21A fragment, mud turtle
 24A fragment, other lizards
 32C tibia, turkey
 0 number of unidentified bone fragments per square

Pit 3
 5 zea mays (maize)
 8 persea americana (avocado)
 22 casimiroa edulis (white bean)
 30 ceiba parvifolia pods (pochote)
 38 opuntia spp. leaves (prickly pear)
 47 crescentia cujele (tree gourd)
 48 unidentified cucurbita spp. (squashes and pumpkins)
 51 c. pepo
 52 lagenaria siceraria (bottle gourd)
 54 agave spp. quids
 55 agave spp. leaves
 62 tillandsia spp. leaves
 65 beaucarnea gracilis (sotolin)
 82 bark
 83 wood
 3A fragment, white-tailed deer
 3E phalanx, white-tailed deer
 3R ramus, mandible, white-tailed deer
 3T antler, white-tailed deer
 4J femur, peccary
 16A fragment, opossum
 18A fragment, gopher
 32A fragment, turkey
 0 number of unidentified bone fragments per square

Pit 4 -----
 5 zea mays (maize)
 6 acrocomia mexicana (coyol)
 8 persea americana (avocado)
 16 p. coccineus (runner bean)
 17 p. lunatus (sieve bean)
 18 p. vulgaris (common bean)
 21 prosopis juliflora guids (mesquite)
 22 casimiroa edulis (white bean)
 26 cyrtocarpa procera (chupandilla)
 27 spondias mombin (ciruela)

30 ceiba parvifolia pods (pochote)
 31 cephalocereus hoppenstedtii (tetecho)
 38 opuntia spp. leaves (prickly pear)
 40 opuntia spp. fruit (prickly pear)
 43 capsicum annuum (chili pepper)
 51 c. pepo
 52 lagenaria siceraria (bottle gourd)
 54 agave spp. quids
 55 agave spp. leaves
 58 yucca periculosa leaves
 60 brahea dulcis (palm)
 62 tillandsia spp. leaves
 65 beaucarnea gracilis (sotolin)
 70 grasses (unidentified)
 82 bark
 83 wood
 3E phalanx, white-tailed deer
 6C tibia, cottontail
 6D femur
 6E innominate, cottontail
 6J maxilla, cottontail
 6K scapula, cottontail
 198 other, dog
 19E metapodial, dog
 24A fragment, other lizards
 32A fragment, turkey
 32C tibia, turkey
 32F radius, turkey
 0 number of unidentified bone fragments per square

Pit 5 ~~~~~
 5 zea mays (maize)
 9 acacia spp. pods
 21 prosopis juliflora guids (mesquite)
 3A fragment, white-tailed deer
 6H humerus, cottontail
 6K scapula, cottontail
 32A fragment, turkey
 32H humerus, turkey
 0 number of unidentified bone fragments per square

Pit 6 xxxxxxxx
 27 spondias mombin (ciruela)
 43 sideroxylon cf. tempisque (cosahuico)
 55 agave spp. leaves
 70 grasses (unidentified)
 83 wood
 24A fragment, other lizards
 0 number of unidentified bone fragments per square

Others
 1 diion edule
 5 zea mays (maize)
 8 persea americana (avocado)
 9 acacia spp. pods
 21 prosopis juliflora guids (mesquite)
 22 casimiroa edulis (white bean)
 26 cyrtocarpa procera (chupandilla)
 30 ceiba parvifolia pods (pochote)
 38 opuntia spp. leaves (prickly pear)
 40 opuntia spp. fruit (prickly pear)
 43 sideroxylon cf. tempisque (cosahuico)
 51 c. pepo
 52 lagenaria siceraria (bottle gourd)
 54 agave spp. quids
 55 agave spp. leaves
 58 yucca periculosa leaves
 63 tillandsia spp. spikes
 65 beaucarnea gracilis (sotolin)
 70 grasses (unidentified)
 81 thevetia peruviana
 82 bark
 83 wood
 3C rib, white-tailed deer
 6G radius, cottontail
 19C vertebra, dog
 32C tibia, turkey

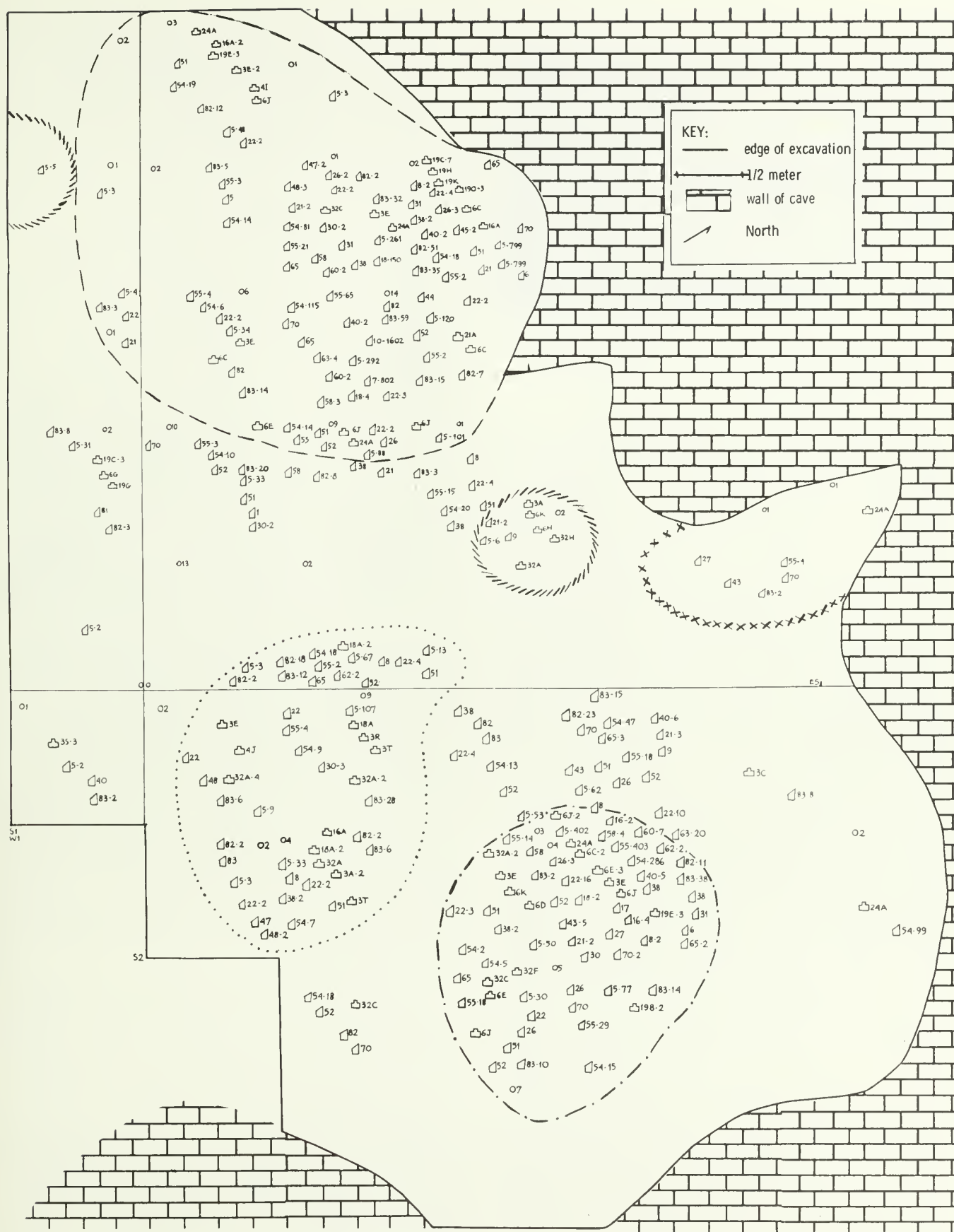


Fig. 16. Ecofacts of Zone C of Tc 35e (above) with key (left).

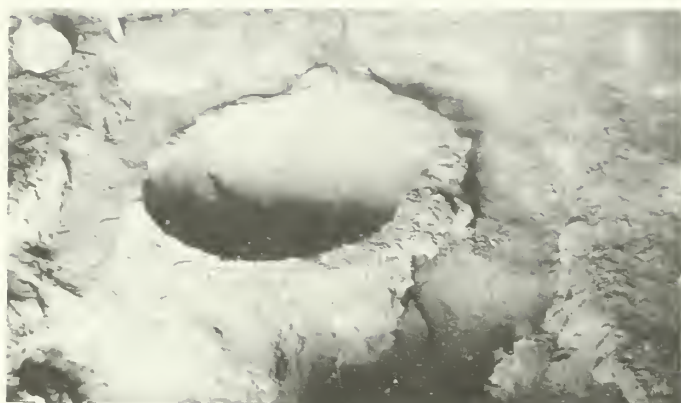


Fig. 17. Plaster-lined soaking pit in east part of Zone C of Tc 35e, as seen from the west.

area a weaver's comb, a bone awl or bone weaving pick, and pieces of polished stick (probably a loom stick) were associated with this type of cloth. Also, two pieces of one-over-two semi-basket weave cotton cloth occurred in this area. The northern weavers showed some versatility. A third piece of one-over-two cotton cloth and a piece of dyed red weft cording cloth was in the southern area. The other piece of weft warp cording cloth of painted cotton was in the northern area. A few nodules of hematite were found in this northern activity area as well as an ovoid muller with hematite adhering to it. We found examples of other weaving of an entirely different nature. Twilled petates were made by *Agave* strands in both areas, and a split-stitch basket weave was made in the northern area.

Closely associated with the east end of the southern activity area, another significant concentration of objects was concerned with textile making of a slightly different nature. This apparently was where bark cloth was made (Activity Area 4). A piece of bark cloth tied in a square knot was found there as well as a fragment of *Cissus* and four other pieces of bark cloth. Three pieces of bark cloth and a fragment of *Cissus* occurred in a plaster-lined pit which had its center roughly at S1.2E4.2. (See Figs. 15, 17.) About a meter in diameter at floor level and about 65 cm. deep, it had a flat bottom of a diameter of about 50 cm. All the pieces of bark and the bark cloth were sticking to the plaster sides; so we assume that this pit functioned for soaking the *Cissus* bark. After the bark had been soaked it was then beaten with a barkbeater of the *Celebes* racket type (a type found at the side of the pit) to form folded rectangular strips of bark cloth; and perhaps soaked and beaten again, as the two fold-

ed specimens in the pit are fairly well finished. Though the fragments contained ash and lime, it is problematical whether they had been soaked in any special solution. The loop of bark cloth tied with a square knot leads one to suspect that one of the purposes was to make "baby ceremonial sandals." At present, bark cloth is made by shamans, or witches, and in Tehuacan, as in most of Mesoamerica, it has a sacred and magical aura. Is it not possible that the participants in the southern weaving area of Zone C were some sort of sacred or priestly practitioners? It would appear that these practitioners did not confine themselves to ceremonial activity, for there is abundant evidence of more mundane undertaking.

Flint knapping was a major activity during the occupation of Zone C but evidently it did not occur in any specific area. Most of the chips and the chipped artifacts were randomly distributed over the surface floor, with only a slight concentration in a six-square-meter area bounded by Squares 0-0, S2, E3, and S2E3. Like the previous level, most of the flakes and flakes for artifacts seemed to have been struck by percussion blows using a pebble hammerstone against a prepared striking platform on either blocky cores or pebble nodules. Other earlier techniques of Zone D were also in use. Working obsidian differed, however. The predominant method was to use impulsive pressure in striking blades from nuclei with ground platforms, rather than indirect percussion against bullet-shaped nuclei, the method of the previous occupation.

The inhabitants probably knew how to make ground stone tools, but, like ceramics, it seems that this activity occurred elsewhere. The stave-shaped mano, the cuboid mano, the rectangular metate, the spherical mano, a pendant, and the milling or metate fragments were all made of volcanic tufa and we uncovered no fragments of it in Zone C. These manufactured objects were perhaps brought in or traded in, as were the obsidian, figurines, spindle whorls, resident pottery, and sherds of Y Fine Orange, X Fine Orange, and Tilapa Red-on-buff.

Working skins, as evidenced by the leather strands, end-scrapers, side-scrapers, and scraper-planes found, was another activity, as was bone-working (one bird bone bead, one bone pendant, and one bone awl found). Perhaps more important than either of these was woodworking. We uncovered sawed *carrizo* tubes, two other pieces of sawed *carrizo*, a sawed gourd, and a sawed arrow shaft. Other wood—the four cut sticks, the polished stick, the pounded stick, the stick in the weaving comb, the wooden plug, the painted wood, and the handle of the barkbeater—had been whittled

into shape. Three fruit pits had faces carved on them and a ciruela seed had been pierced. The so-called side-scrapers, the gouge, the discoidal choppers, the ellipsoidal chopper, the flake choppers, and perhaps the flaky core choppers were all tools of this trade. Although all of these activities probably occurred within the cave during this occupation, apparently none were confined to a particular area.

Ceremonialism, mentioned above in connection with bark cloth making, played a part in the life of Zone C. We uncovered thirteen fragments of at least two incense burners, or xantiles, a Toltec type mold-made figurine head, and burned bones of two burials, an infant and an adult female (Activity Area 2). The latter was represented by only skull and teeth fragments which seemed to have been separated from the body (elsewhere?) before it was burned. It might have been the result of some sort of ceremony connected with cremation and human sacrifice.

The artifacts, particularly the pottery, indicate that Zone C must be considered a Venta Salada component. According to most of the types and their percentages occupation in all probability took place early in Venta Salada times, perhaps in the eighth or ninth century after Christ.

The Way of Life of Layer 3 and Zone B

Zone B overlay most of the east niche (about 32 square meters) directly beneath the cemented floor of Zone A. The stratum was about 20 cm. thick composed of a brownish ash with a tendency to be darker in color near its surface. It was unconnected stratigraphically with the refuse in the west niche, but since the proportions of ceramic remains were so similar to those of Layer 3 of the west niche, covering about 30 square meters, it seemed likely that the two were, at least in part, contemporaneous. Layer 3 of the west niche was composed of dark brown refuse from 20 to almost 40 cm. thick and lay below the churned-up Layer 2 with its burials which, in turn, was beneath the cemented floor Layer 1 with its intrusive burials. Perhaps Layer 2 was being occupied during the final stages of Zone B of the east niche, but because sherd proportions don't indicate this, we are treating Layer 2 as a separate, though ill-defined, occupation.

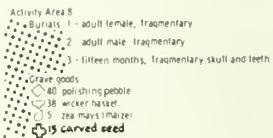
The plant and animal remains show that Zone B and Layer 3 were occupied on a year-round basis. Further, three pits dug down from its surface had two or three strata in them indicating use at a number of different times. The area of refuse suggested occupation by a macroband, but it is possible that there were a number of different microbands that lived in different parts of

Zone B and Layer 3. Since the two fire hearth areas were widely separated, it seems likely that it was the former rather than the latter (see Fig. 18).

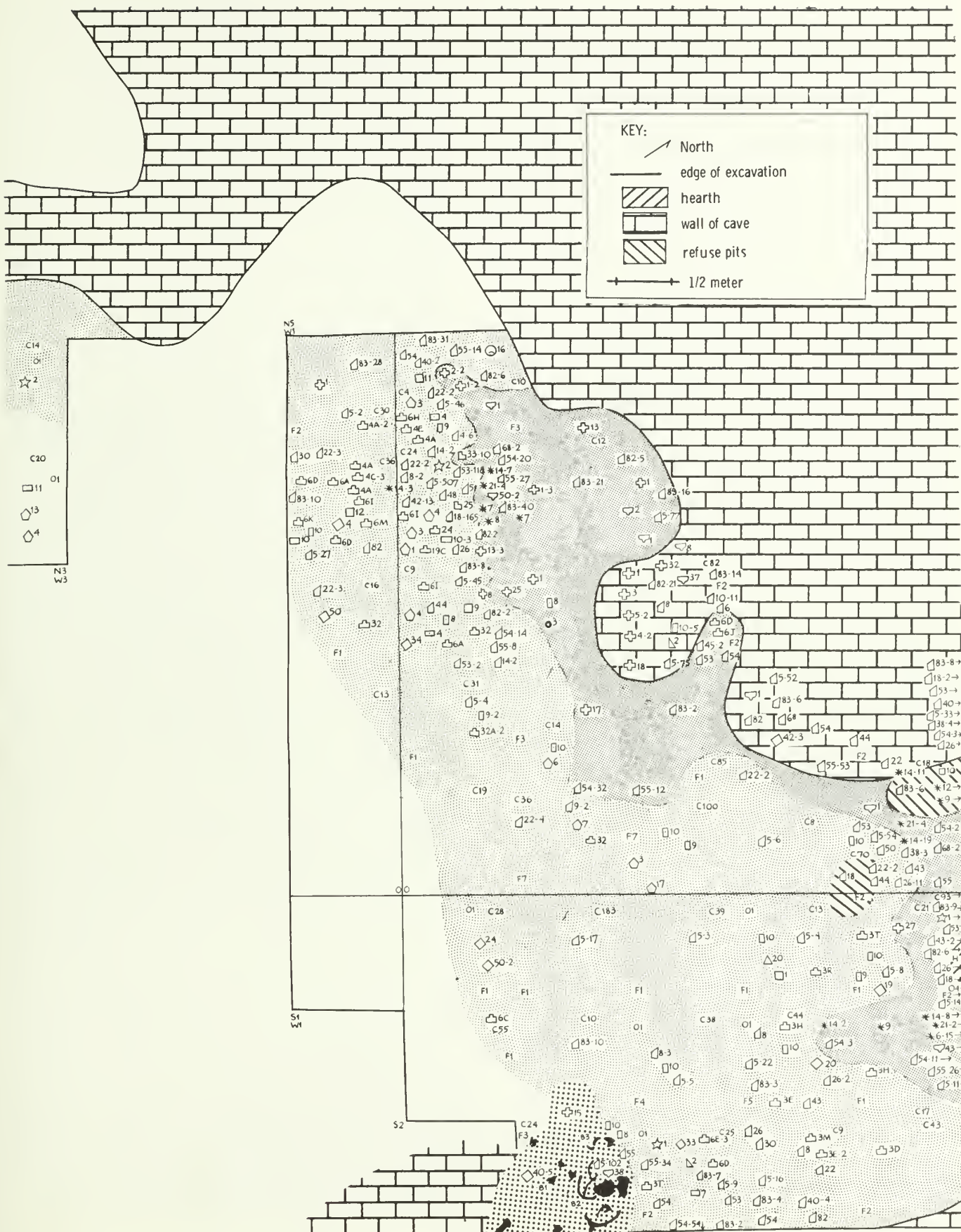
Like the later occupations of the El Riego Cave, wild plants provided only a very small part of the diet (about 6 percent) of the occupants. A few seeds of *Agave*, *Bumelia*, *Acacia*, mesquite, *Apodanthera*, and wild *Cucurbita* appeared to have been gathered. A fruit of *Opuntia* and pods of mesquite, *Acacia*, and pochote apparently were plucked. The greatest proportion of their wild plant diet, however, seemed to have come from *Agave* leaves, with lesser amounts from grass, mesquite, and *Opuntia*. One definitely human feces (Cop. 73) had *Agave* fibers in it, while Cop. 58 had mesquite and *Zizyphus* leaf fragments. An *Agave* strand tied in a loop may have been used to carry these remains back to the cave. There were also three pieces of a tump line. We lack information on how the plants were prepared; nevertheless an ovoid muller, a mano, and milling stones in the west niche suggest that some of the seeds might have been ground; the scraper-plane fragments might have been used to scrape leaves.

Since the El Riego region is one that abounds in game in all seasons it is not surprising to find that meat was an important part (38 percent) of their diet. The bones indicate that most of the meat came from deer or peccary; also, coyote and bobcat hair are recorded as present in feces No. 73. It seems probable that these animals were hunted and that the bow and arrow was one of the weapons used. Catan (3), Matamoros (2), 6 arrow tips, and the distal end of a cane arrow-shaft were found. The presence of Ensor (1), Palmillas (2), Shumla (1), Coxcatlan (2), San Nicolas (1), and Trinidad (1) points in the west niche may be taken as evidence that the atlatl was still in use, unless they were dug up from earlier levels. Bones of at least three rabbits were also found. These might have been caught in snarcs, or by hand, along with the lizard. Bones of a wood rat were present and the mouse hairs in feces No. 23 indicate its use as food. Dog bones and turkey bones indicate that these domesticated animals were occasionally used as food. Whether any of the skins of these animals were scraped or prepared is problematical. Although we found three end-scrapers, no hair or skins of animals were uncovered.

Most of their diet came from domesticated plants. These included mainly corn of either the slender pop, late tripsacoid, or Nal-Tel-Chapalote varieties, although a few examples of dent, Zapalote Grande, and Zapalote Chico did occur. There is good evidence of irrigation in the area of El Riego at this time, and it



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seems likely that the corn was grown, at least in part, in artificially-watered fields, perhaps with chili peppers, pumpkin, *moschata* squash, and black and brown common beans. The four digging sticks were undoubtedly used in planting these seeds. Perhaps the avocado, black and white sapotes, chupandilla, cosahuico, and coyol were grown in well-watered orchards nearby.

Food preparation techniques showed a continuation of Venta Salada practices. Large animals were butchered outside the cave; sections of meat with adhering long bones, vertebrae, and jaws, possibly with the tongues, were brought in. Rabbit, fox, gopher, lizard, and turkey were, however, brought back more or less intact. Two areas of concentration of animal bones were in Squares N3, N3E1, and N4E1 near a huge pit in the east niche (257 of the 349 bones found) as well as S2E4 (Activity Area 7) and along the back wall of the cave in the west niche where most of the bones were uncovered (Activity Area 3). Three of the 4 end-scrapers and 4 of the 7 side-scrapers and 2 choppers were associated with the bones in the east niche.

It seems that roasting was not a popular technique for cooking food. Only four bones and five corn cobs were charred and none of the five ash pits contained any fire-cracked rock. It seems that a more popular mode was grinding. Seven molcajetes (six with stamped bottoms and one incised) of Coxcatlan Brushed, three molcajetes of Coxcatlan Gray (two stamped and one incised), and one incised bottom sherd of El Riego Black were uncovered. It seems likely that these molcajetes were used to grind up the chili pepper and perhaps other seeds. Some of the chili pepper seeds in Cop. 73 had been definitely ground and pounded and looked like modern chili seeds worked in molcajetes. Other grinding was done on and by stone tools; a euboid, a spherical, and 2 oblong manos and 9 mano fragments were uncovered, along with 2 trough metates, a footed rectangular metate, a metate fragment, 2 milling stones or metates, and an ovoid muller. Some of these were concentrated in the center of the west niche (Area 4). Corn kernels were usually prepared for grinding. In our corn study it was noted that most of the glumes of the tripsacoid and slender pop cobs were cut. Ground corn was sometimes made into nixtamal and the nixtamal baked into tortillas on comales (9 found: 5 El Riego Marble-tempered, 2 El Riego Orange, 1 El Riego Plain, 1 Quachilco Mica).

Quantitatively, the ceramics, or perhaps we should say the carbon adhering to the ceramics, was striking evidence of a method of food preparation. From our study of rim sherds we estimated that there were the

remains of about 103 vessels in Zone B and Layer 3, 18 of which were comales or molcajetes. Of the remaining 85, at least 39 (mostly from the east niche) had carbon adhering to their interiors. There may have been more where the adhering carbon shook loose somewhere between the field and the cave. What is even more surprising is that 33 of the 39 were all various kinds of bowls of various pottery types. These were: a hemispherical bowl of El Riego Plain; a carinated-rim, three outsloping-wall, two flaring-wall, three hemispherical outangled-rim, two hemispherical beveled-rim, four everted-rim, and five hemispherical direct-rim bowls of Coxcatlan Gray; a composite silhouette, an outsloping-wall, a hemispherical beveled-rim, a hemispherical everted-rim, six hemispherical outangled-rim, and two carinated-rim bowls of Coxcatlan Brushed. In addition to the bowls, there was a funnel-neck olla of El Riego Orange, a short-neck olla of Coxcatlan Brushed, a long-flaring-neck olla of Coxcatlan Gray, a short-neck olla of El Riego Marble-tempered, and a short- and a long-neck olla of Quachilco Mica which also had carbon adhering to their interiors. Evidently a considerable amount of food was cooked (boiled?) in bowls and ollas. The other 47 vessels (15 ollas and 32 bowls) gave no indication of their use. While some may have been used for cooking, others could have been used for soaking beans or nixtamal, for eating, or for storage of water and other materials. Some may have been merely decorative. Four bowls, however, did occur with Burials 3-1 and 3-2, and a small wicker basket filled with corn was found with burials B1-3. Many of the varieties of common beans (about 101) occurred in a small depression. It seems that corn was also stored or dumped into three of the pits in the east niche.

Other less mundane activities were connected with the food quest. Raw materials for a flint-knapping activity included 294 chips of local El Riego grayish chert and 72 chips that seemed to have come from local pebbles. A number of chips were definitely imported; 51 obsidian chips and 39 honey-colored chips probably came from farther down in the valley. Chips were spread throughout the whole area with only one significant concentration in the west niche in Activity Area 2. In the general area of N3 and N4E1, however, concentrations of El Riego chert chips were slightly larger than elsewhere; but then this was the area where there were simply more artifacts. A fair number of El Riego chips were concentrated in Squares N5W6, N5W7, N5W8, and N6W7, but here again, these were four squares of Activity Area 2 that had many more complete artifacts than were found elsewhere.

As was probably true in all the previous occupations, cores were initially struck by percussion blows from large blocks of flint; however, flint-knapping techniques showed a radically new shift in emphasis during this time period. Now, in both the east and west niches, the majority of complete artifacts were blades struck from fluted polyhedral cores. There was a slight difference between the east and west niches: most of the blades in the east niche were struck from cores with ground striking platforms by the propulsive method; in the west niche more of them were struck by indirect percussion from polyhedral cores with prepared chip-striking platforms. In either case, these were the complete artifact types dominant in both niches. Some of the fine end-scrapers and end-of-blade scrapers were made from these blades with a little unifacial pressure retouching. At least two of the Catan and perhaps both of the Matamoros points were also made initially from blades that had been bifacially pressure-flaked to form final artifacts.

The other dominant technique was to knock off long rather thick flakes from large cores with prepared striking platforms. These were then chipped bifacially, mainly by pressure, to form projectile points, choppers, and other objects. The least common practice was to knock flakes off of cores with or without prepared striking platforms by percussion, and then unifacially retouch these tools to form final artifacts. Even here, more of them were retouched by pressure than by percussion. The tools of the trade were a few hammerstones and two pieces of chipped antler which probably were pressure flaking tools.

By grinding stone rather than chipping, various kinds of metates, beads, and so forth were made; almost all from volcanic tufa except for the spherical bead made of jade. No flakes of these materials were found in the layers; undoubtedly all of these ground stone tools were made elsewhere and imported into the cave. The spherical bead looks as if some sort of special drill were worked on two surfaces to make the central hole.

We found in the refuse (Areas 5 and 6) examples of woodworking, a major industry during this occupation. First of all, there were a number of pieces of cut logs. These may have been cut with polished celts, which we did not find, however. Or, they could have been cut by some of the choppers which we did find. In contrast to the earlier method of cutting logs, these were cut in the axman's fashion, from two sides, rather than whittled around in beaver fashion. Some logs were split into long slabs and then cut or sawed to the desired shapes. The paddle and the weaving tool were

made in such a manner. The most common way of working wood, however, was to take relatively small sticks, scrape off their outer bark, and whittle them into the desired shapes. One other method was sawing fragments of *carrizo* and gourd: one such fragment was carved into an effigy. Some of the sticks were also polished. Tools of the trade were not numerous; however, almost all of the unifacial side-scrapers and blades could have been used in the whittling and splitting processes, and the choppers for major cutting. These same tools could have been used in working bone and making the bone awl.

As was true in the previous horizons, there was considerable evidence that quite a bit of weaving was going on during this occupation. A general concentration of weaving tools or objects connected with weaving was found from S2E6 to about N4 in the east cave and two of the easternmost squares in the west cave, a diagonal area behind the main concentration of chips, fire pits, and other objects (Activity Area 6). A number of cotton bundles were distributed over much of the east cave. There were also quite a few *Agave* quids. Neither of these were in any particular concentration; however, we began to see some sort of concentration in the tools connected with weaving.

A bell-shaped spindle whorl occurred in N2E2 and a semi-conical one in N5W4. Probably string of both istle and cotton was made with this implement. Although string-making apparently was not a large industry in this general time period, we did find about 50 spindle whorl-made Z-twist cotton yarns, as well as 10 hand-made S-twist cotton yarns. *Agave* strands and cord were much less numerous and made up no particular concentration. For that matter, neither did the cotton string. Three pieces of what seemed to be the tump line were made by warp method, probably on some sort of very narrow belt loom. There were also two fragments of a one-over-one basket-like weave made of istle fibers spun fine on a spindle whorl. Cotton fabrics were not as numerous; however, we did find two pieces of cloth, made one-over-one on a belt loom, and one piece of cloth, one-over-two, also made on a narrow belt loom. In the general area of N4E1-3 there were quite a number of objects that could be considered weaving tools. One of the small pointed sticks may very well have come from a comb. There also, besides the possible comb, was a rectangular weaving tool, probably a heddle. A paddle-like object which may have been used as some sort of a tamper for pushing down the weft element was found in Square N2E3. Along with it and the comb fragment were three other pointed sticks and two pieces of

polished sticks. The latter were polished on one side and looked as if they may have been holders for the end of the belt loom. The other pieces of polished sticks occurred in the next Square N3E2 creating an area of great concentration of wooden objects. One of the wooden objects in Square N3E2 was pointed and had been pounded on one end. It looked as if it might have been the sort of tool that could have been stuck like a post into the ground in order to hold the end of the whole belt loom. Besides these evidences of weaving were 3 petate fragments not associated with the other weaving tools and a piece of a wicker basket found with the burial in S4E3. One final item was a piece of bark cloth in N1E4. This did not look as if it were made necessarily in the cave; it was probably made elsewhere and brought in for some sort of ceremonial purpose.

A single fragment of a figurine showed a female wearing some sort of ankle-length frock. Above the frock may have been a kind of triangular *huipil* or shirt. These were probably the sort of things these people were weaving.

There was some evidence for ceremonialism in this level. The figurine, the piece of bark cloth mentioned above, and some little pits with carved faces on them all must have been used in ceremonial activities. Five cut slabs of wood found probably served as paint pallets. Most interesting, in the north end of the east cave, in what might almost be considered a niche, were sixteen fragments of some sort of a *xantil*. Three of these pieces were painted blue and green, and, on the basis of the colors, one might guess that this was the dress ornament of Chalchahuities, the goddess of springs and running water, a most appropriate goddess for a cave in the El Riego springs area.

One huge grave and a basket associated with it represented a major burial in the east niche (Area 8): a humerus and fragments of skull and teeth and so forth of an adult female, a fragment of a male jaw or piece of skull and two or three vertebrae, and a fragment of a 15-month-old child whose skull and teeth had been badly burned. This again looked like some sort of human sacrifice or ceremonial cremation and burial in the cave. There were also burials in Layer 3 in the west niche on the edge of the cave in N7W9 (Area 1). Here an almost complete adult female was well represented by skull and teeth, and a 13-year-old child by skull and teeth and a few possible rib and vertebrae fragments. These latter burials were well stocked with burial goods. With them were the skeletons of two puppies and two small bowls found one on top of the other; one projectile point and one

spherical bead were inside a large olla. There was also a complete pot of Coxcatlan Gray with a stamped bottom and tripod feet and turkey bones inside it. Small bits of yellow and red ochre were in the burial pits; however, the bones and the pots do not seem to have been sprinkled with it.

The pottery types and the artifacts were obvious indications that Zone B of Tc 35e and Layer 3 of Tc 35w be considered a component of Venta Salada. The general proportions of pottery types and the whole bowls with the burials suggest that it was in the generally late part of Early Venta Salada times, that is, roughly somewhere around 900 to 1100 A.D. It should be particularly noted that this component, like the other Venta Salada zones and even the Late Palo Blanco ones, had a very definite ceremonial aspect to it. One might surmise that the inhabitants of this cave during these times definitely were not slaves or peasants; more likely they were small-time priests with homes and bases in major towns and ceremonial centers who occasionally came into El Riego Cave for certain specific activities.

The Way of Life of Layer 2

Layer 2 in the west niche was composed of a dark brown rather friable soil varying in thickness between 10 and almost 40 cm., averaging about 20 cm. This layer clearly lay under small patches of the cemented floor of Layer 1, which adjoined Zone A of the east cave. It overlay Layer 3 which was roughly connected with Zone B of the east niche. While Layer 2 may have been of the same general time period as Zone B and Layer 3, the variation in pottery types indicated that the occupation for the most part occurred following that of Layer 3 and Zone B. It covered only about 30 square meters, had only one small fireplace in it, and must have been occupied by a relatively small group. At any rate, the occupation was not well defined and we did not consider Layer 2 to be a good, solid, or "pure" component, but rather a "possible" component or occupation. There was no indication as to its seasonality, and the data on most of the other activities was extremely poor.

The arrow points, three Teotihuacan, a Tula, and a Matamoros, indicate that the bow and arrow was used in hunting, and from the Morhiss, Tehuacan, Garyito, San Nicolas, and Trinidad points we gathered that the atlatl had not gone out of existence. There was no direct osteological evidence of hunting, however, for the only bones we found were those of two cottontails and one jackrabbit. There were, however, a few fragments that had been cracked and smashed. These

seemed to have come from larger mammals which might have been hunted. The presence of the small rabbits hint that some trapping was done during this occupation. We have no direct evidence of other subsistence activities in the way of tools or preserved foodstuffs. What little evidence we have came from food preparation artifacts. There were a number of manos and metates which could have been used to grind up corn as well as other seeds. There was also a piece of a comal which may have been used for cooking tortillas—perhaps indirect evidence of the use of corn. One fragment of a truncated cone pestle and a number of bowls or molcajetes suggested that chili peppers were grown. The only really good evidence of an agricultural plant was two pieces of cut gourd.

There was little evidence of butchering, although any of the side-scrappers and the various bifacial knives and choppers could have been used in this activity. No burned bones were found as direct evidence of roasting, nor did any of the bones look like they had been cut or scraped for marrow. As in the previous layer, there was some evidence that some food was cooked. One olla and four bowls showed evidence of carbon on the interior, a possible indication of roasting. Two of the four bowls were of El Riego Plain and the other two were of El Riego Black. The one olla with a long flaring neck was of Quachilco Mica. All the other vessels, and there were at least forty, seemed to have been used for storage, or at least they showed no evidence of cooking. Twenty-seven of the bowls and one of the eight ollas were painted and decorated. These vessels may have been used more often for eating purposes than for the storage of food or for cooking. There were also at least two El Riego Marble-tempered sherds that were of comales, and two small bowls of El Riego Plain probably could have been used in a similar way. The other vessels included a funnel-neck and a straight-neck olla of Quachilco Mica, three hemispherical bowls with direct rims, three hemispherical bowls with everted rims, and two beveled-rim hemispherical bowls, an outangled bowl and an outflaring-rim bowl of Coxcatlan Gray. At least two hemispherical bowls and an outflaring bowl were of El Riego Black; a straight-neck olla and a plate were of El Riego Polished. One bowl of Coxcatlan Polychrome was of the outflaring-rim type; eight bowls of Coxcatlan Brushed included an ellipsoidal bowl with an angled rim, an outflaring-rim bowl, a hemispherical bowl, a hemispherical bowl with an outangled rim, a hemispherical bowl with a beveled interior, an incurved-rim bowl, and a cylindrical bowl. There also was a short-neck olla of Coxcatlan Brushed. In Coxcatlan Red, there was a frag-

ment of a hemispherical bowl with a direct rim and one with an outangled rim. There were two bowls of Teotitlan Incised, one hemispherical and one with an incurved rim. There was also a fragment here of either a cylindrical bowl or a piece of an olla. There was one incurved-rim bowl of Coxcatlan Red-on-orange and a deep hemispherical bowl of Thin Orange. There also were body sherds of Coxcatlan Red-on-cream, El Riego Gray, Aztec Red-on-black, and Cholula Polychrome—actually quite a lot of pottery of a wide variety of types. Most of this pottery was undoubtedly made elsewhere in the Tehuacan Valley, as well as in the Valley of Mexico and around the towns of Puebla and Cholula, and brought back into the cave for use there.

About fifty uniface, mostly blades with ground striking platforms, indicated that the propulsion technique was commonly used in a flint-knapping industry. There were, however, some that showed pressure flaking, and a few crude blades undoubtedly were made by percussion. The other uniface seemed to have been made from blocky cores, and almost all of them had evidence of prepared striking platforms. Many of these other uniface had retouching on their ends or their sides, the so-called end-scrappers and side-scrappers. There were 21 tools which were bifaces fashioned into final form by pressure flaking. These included most of the projectile points as well as some of the bifacial knives. There were also a number of choppers bifacially worked by percussion. All in all, evidence on flint-knapping was not good, but it was indeed an activity during this occupation, and was carried out in a manner not radically different from that during the preceding Zone B and Zone A following.

Almost all of the ground stones were made from pieces of volcanic tufa. The objects themselves, the ovoid muller, the two ovoid plano-convex metates, and the rectangular tripod metate, were probably all made outside the cave and brought into the cave for use. This was also true of the small fragment of a celt with a pointed pole and the discoidal and spherical beads made of a green stone. We suspect that these had been first roughed out, perhaps with a flint gouge, and then polished into their final form. Whatever the exact technique was, it was not done in the cave.

One activity seemingly carried on within the cave was woodworking. Besides the small piece of a celt with a pointed pole mentioned above, a number of choppers, a spokeshave, and two gouges were found. Of course any of the many side- and end-scrappers and scraper-planes could have been used. It is more likely, however, that the two thumbnail end-scrappers, the one fine plano-convex end-scraper, the one fine flat-top

end-scraper, the two thin flake scrapers, and the various scraper-plane fragments were used for scraping skins and perhaps plants.

Unlike the other late occupations in the cave we found no evidence of textile-working, nor did we find any fragments of spindle whorls or pierced potsherds that might have been used as spindle whorls. Also, there were no figurines in this level, which would at least have given us a hint as to the kind of clothing these people used, even if they didn't make it during their occupation.

The lack of figurines does not mean that there was no ceremonial activity, however. In fact, there was a great deal of ceremonial activity during this nebulous occupation. In Square N5W5 were found the bones of a burial—a child about six years old. The bones were fragmentary and looked as if they had been all chopped up. There were no skull fragments with it. In Square NSW8 there was also part of a burial of a five-year-old child, almost a cretin. A pot was with it. In Square N6W9 were parts of at least three burials. One is represented by only a pair of burned legs, possibly of a female. There were no skull fragments with it. A second one was of a newborn child, and the third one was of a child between two and four years old in a flexed position. With and around these objects were four decorated pots. Spherical and discoidal beads were also found with these three burials. Not far away from the first burial were a number of fragments of Coxcatlan Gray that could very well have represented an offering associated with that burial. The other vessels found almost in complete form were of Coxcatlan Brushed. These apparently had been placed in the ground as some sort of ceremonial offering. They could, of course, have been for storage of food, a practical rather than ceremonial reason for being in the deposit. Although all were recorded as Layer 2, there is the possibility that some were intruded from Layer 1 and that evidence of their intrusions was not apparent in the dark brown refuse.

The pottery types of Layer 2, as well as the other artifacts, indicate that it was a component or a number of components of Early Venta Salada times, near the termination of this subphase, somewhere between 1100 and 1200 A.D.

The Way of Life of Layer 1 and Zone A

The final aboriginal occupation of El Riego Cave was under a layer 10 to 20 cm. thick of hard cemented goat dung. In the east niche two kinds of deposits seemed to be contemporaneous, for the refuse of each were connected. In the north portion under the dung

was a thin layer 5 to 10 cm. thick of gray refuse over a stucco floor about 8 cm. thick, while in the south portion this gray ashy stratum under the dung lay directly on the brown Zone B.

In the west shelter, a thin layer of gray ash under the goat dung, and over Layer 2, covered the entire north half of the cave. Stucco against the north rock wall of the cave was also under a small portion of the gray refuse. Elsewhere, pieces of stucco were churned up in the refuse. This suggests that at one time this western cave also had a stucco floor underlying the ash that later was destroyed by (water) erosion, wear, and pitting by the final occupants (Fig. 19).

Plotting the extension and topography of the stucco floor and its associated features and artifacts revealed architectural aspects of this final occupation which had important social implications. In Square 0-0 we first discovered in the stucco floor a line of four post holes between 5 and 10 cm. in diameter and about 20 cm. apart, extending from about N15W1 to N105W0.55, which were at right angles to two other more widely-spaced posts (at N135W1.15 and N16W1.55). We believe this formed a thatch-roofed portico to the inner room of the east cave that had closely-spaced poles on its sides and more widely-spaced posts at its inner and perhaps outer ends. On the basis of the position of a fire hearth or altar hearth in back of the inner wall and embankments along the sides of the house we would estimate the portico was about 2.5 meters wide. We were unable to estimate its length because of erosion. About 10 to 20 cm. outside the walls of the portico on its east and south sides the stucco floor rose sharply (10 to 20 cm.) to form a step and indicated that the house and its floor were in a rectangular or square basin. The step above the house basin also formed a rectangular basin. There was another 20 cm. step up about 40 cm. east of the basin of the house at 0W.7 that ran northward to N3.3E1.5 where it turned at a right angle and ran to N5.2W1 where it again turned at a right angle and ran at least as far as N5W2.25 where it had been eroded away. Thus in back of the portico in the cave itself was another rectangular basin about 3.5 meters wide and 3 meters long which also ran out of the cave in a narrow (40 cm.) walk along the sides of the portico. Within this patio-like area, about 50 cm. behind the house, was a circular basin with raised edges filled with charcoal which may have served as a hearth or more likely as an altar fire. Directly in back of the hearth were a great many sherds of xantiles (44 out of the 55 uncovered). The paste of all of them was very similar, or the same, and it seems reasonable to assume that all were from the

same xantil. Eleven of the sherds had stripes of red and white paint, 3 had red paint, and 2 had white paint, one was an aquiline nose with closed eyes, and the other was a fragment of a foot in a red sandal. All this led us to believe that there probably was a xantil of Xipe Totec situated in this inner patio, behind the altar fire. The top step extended from this patio to the rock wall in the north end of El Riego west and disappeared to the south in the center of the cave. Various fragments of stucco on the walls of the west shelter indicated that its floor, or a part of it, had been covered by plaster or stucco, also red. Although much of the plaster was washed clean, enough of it bore traces of dark (Borgia) red paint to make one suspect that all of it was originally painted dark red.

Besides these architectural features were two elongate pits of ash at N5W4 and N7W8.5. There was also a large (80 cm. diameter) refuse pit at S1.5E5 and a huge burial pit (Fig. 20) with skeletons (Burials A-E; cf. Vol. 1 of this series, chap. 6) in the west niche in Area 1-3. Human bones were also found in Squares N6W12 in Area 1-2 (Burial 1-2) and N8W8 in Area 1-1 (Burial 1-1). Caches of ceramics were found in four areas: 2 pots in Square N6W5, 2 pots in S3E3, 3 pots in S3E5, and 9 pots in S3E2. Foodstuffs came from all seasons, and the total area of Zone A and Layer 1 covered about 60 square meters. Thus, relatively few people, probably individuals connected with ceremonial activities (definitely not slaves or peasants), occupied Zone A throughout the year for a number of years. The seven burials may not have been cave occupants, but individuals who were sacrificed, perhaps in this case Callen's "slaves or peasants" (Vol. 1 of this series, p. 289).

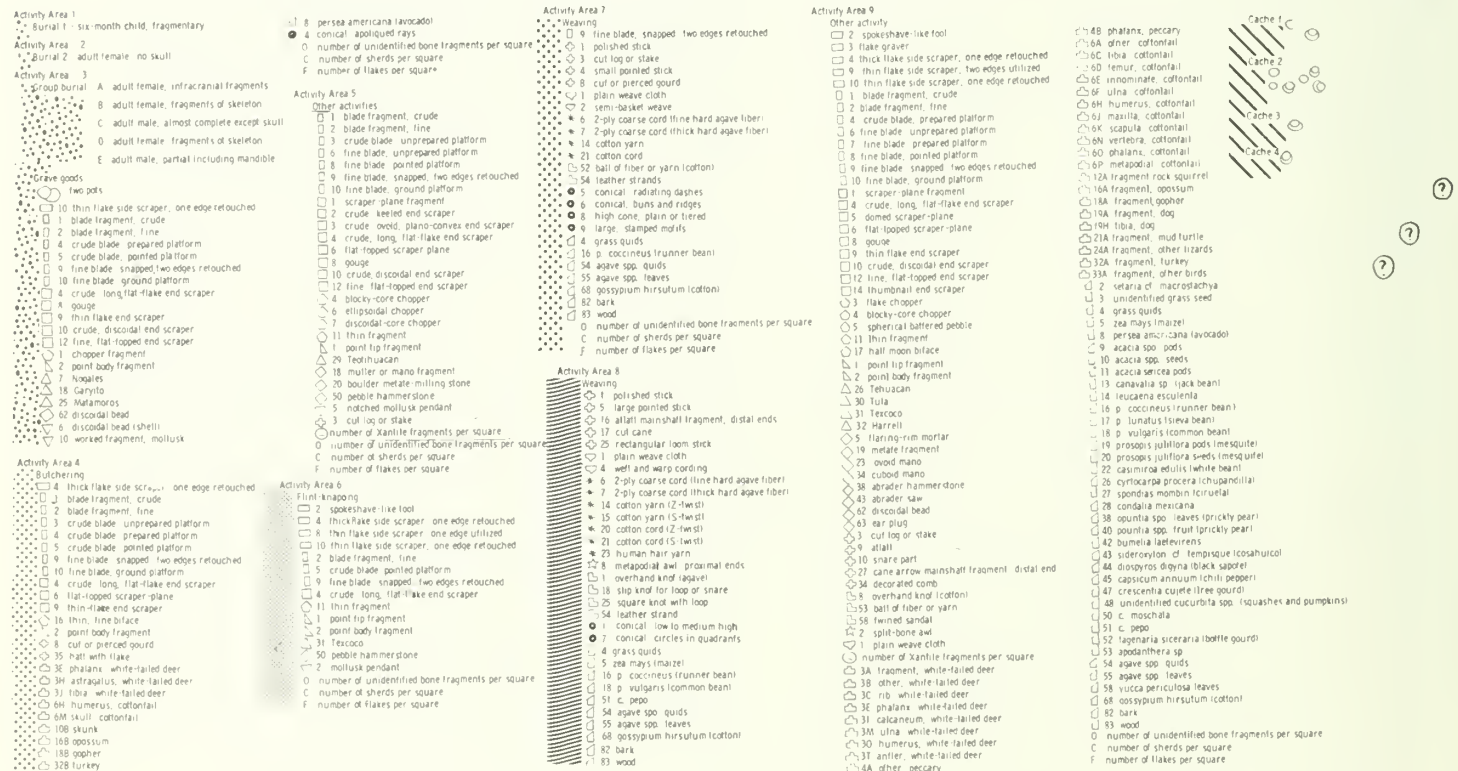
Estimates based on the garbage or refuse indicated that subsistence of the occupants was from agricultural produce (about 68%). Some meat (about 28% of the subsistence) was apparently eaten, but little wild plant stuffs (about 4%). However, analysis of three human feces (coprolites Nos. 60, 61, 62) did show a somewhat different picture. All three showed large amounts of meat debris (No. 60 also showed evidence of cactus, *Agave*, and beans; No. 61, *Agave*; and No. 62, corn). Feces determined to be animal also contained large amounts of meat (No. 59 also contained mesquite; No. 63, *Agave*; and Nos. 65, 69, and 90, mesquite and cactus). We believe the estimates based on the garbage to be closer to the actual diet than those based on the coprolites in which finely-ground corn was not discernible. Corn comprised 90.6 of the 104 estimated liters of agricultural produce (66% of the total food) and 75% of the corn had cut glumes, indicating that it

was ground fine (to make tortillas or gruel) and so was not discernible in the coprolites.

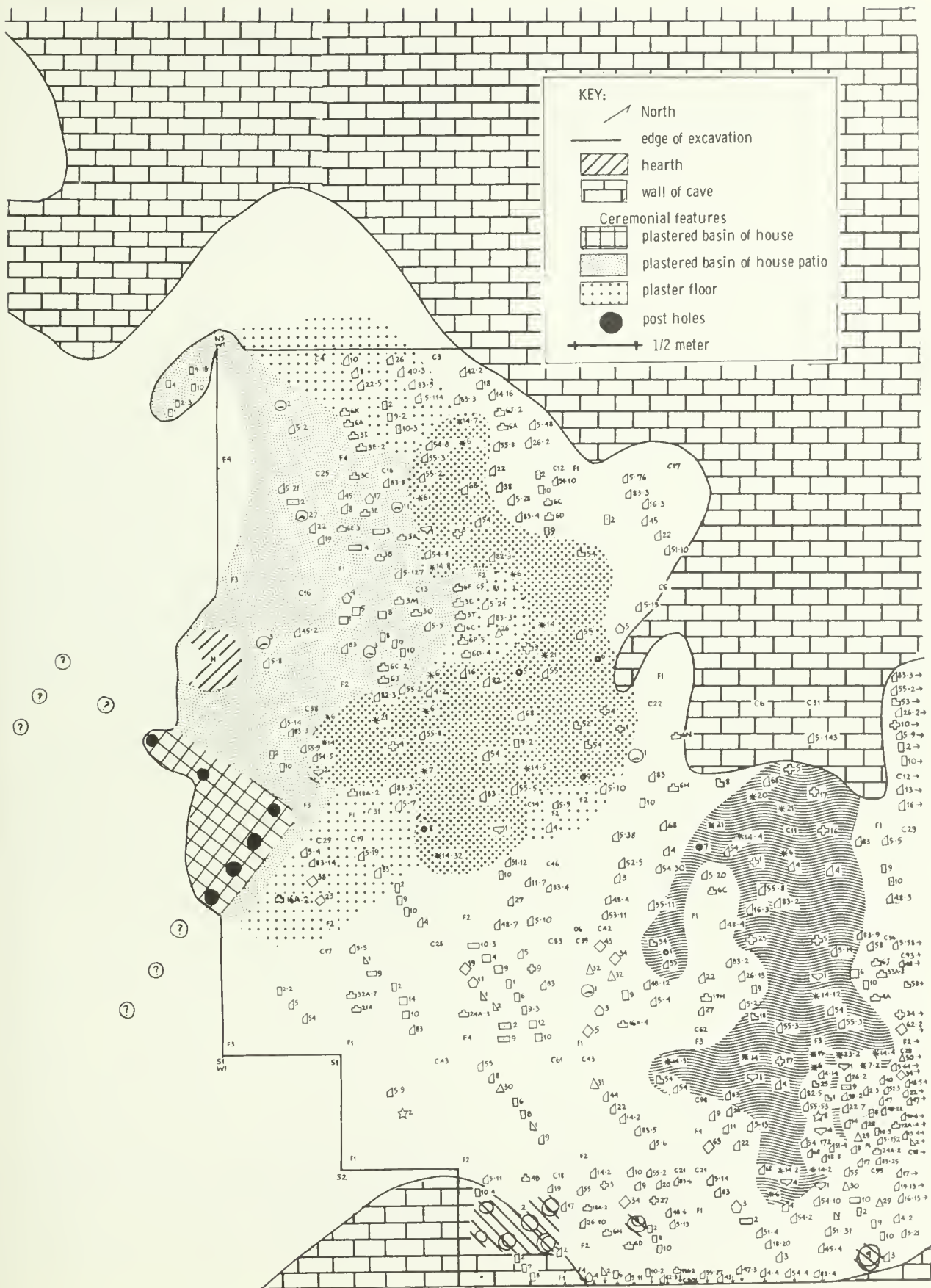
The cut glumes indicate that most of the corn was fine ground, perhaps over the two rectangular tripod metates with the cuboid or ovoid manos. Some of the ground corn was made into a masa for tortillas that were cooked on comales. We found 7 comales of El Riego Marble-tempered paste and one of Quachilco Mica-tempered. Fragments of 5 of the comales occurred near the ash-filled hearth at N7W8.5, evidently a culinary activity area. Somewhat confirming this was the fact that 15 of the 16 vessels with burned interiors (indicating boiling or cooking) came from the west cave. Eleven of them were ollas of various wares, two were cylindrical vessels, one a hemispherical bowl, and the other a composite silhouette. Almost assuredly, beans and meat and other vegetal produce were also cooked in these vessels. While we found many bones, none were charcoal, nor were there any corn cobs. Perhaps roasting had gone out of style; at least no food was roasted by these final inhabitants of El Riego Cave. Mullers and milling stones in the west shelter, 11 stamped-bottom pots in the east, and 8 in the west indicated that some food, perhaps chili and other seeds, was pounded and ground into edible form. The 9 ollas in each niche may have been used for storage or soaking; the 45 bowls in the east niche and the 15 bowls from the west also may have been used for storage or as eating dishes. However, we suspect that many of the bowls from the east niche, since they were decorated and were found in caches, may have been merely ornamental or served some ceremonial purpose. The fire drill equipment indicated how their cooking and ceremonial fires were lit.

Evidences of other subsistence activities were more difficult to estimate. On the basis of the fossil irrigation ditches at El Riego, one might guess that agricultural produce, both fruits and vegetables, was grown in irrigated fields, while the wild plant foods may have been collected locally. Both sets of produce, as well as other materials, may have been carried into the cave in the loops discussed below.

Evidence for their hunting and trapping activities was somewhat more conclusive. Bones of at least one deer were found in the west niche and bones of a deer and peccary were found in the east niche. The occurrence of the proximal end of an arrow mainshaft with 3 Teotihuacan points, 3 Tula points, 2 Harrell points, and a Matamoros point seemed to indicate that the bow and arrow were the preferred weapons; but 2 Texcoco, 2 Garyito, 1 Tehuacan, and 1 Nogales point, with a fragment of the distal end of dart mainshaft,



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indicated the atlatl was still in use. The large animal bones in the cave were mainly limb bones (except for a vertebra and a possible rib) which seemed to show that butchering was done mainly outside the cave, even though many tools (205 fine blades, 19 crude blades, a hafted flake, 9 side-retouched flakes, 4 utilized flakes, 4 bifacees, 1 semi-lunar knife blade, and 11 choppers) that could have been used for preparing the meat were found in the cave refuse.

These cave inhabitants did some trapping as well. We found a snare part with a slip knot of braided maguey rope and overhand knots of maguey and cotton yarn in association with bones of cottontails, gophers, opossums, squirrel, and skunk. The bird, turtle, and lizard bones were probably collected. They also apparently ate a dog and at least three domesticated turkeys. These animals were probably butchered in the cave as bones of much of their skeletons occurred in the refuse. Exactly how this meat was cooked, if indeed it was, is difficult to discern, but the carbon adhering to the inside of various pots suggests boiling in jars or ollas.

Flint-knapping seemed to be almost as important as their subsistence. Besides finding about 326 chipped stone tools, 635 chips were uncovered. About 220 of the artifacts (mainly blades) and 60 of the chips were of obsidian that had been imported both from Puebla and near Teotihuacan. However, the most common material was from the whitish-gray chert from the El Riego beds. There were 379 chips, and most of the rest of the artifacts, from that source. A few artifacts and 101 chips were of honey-to-brown chalcedony from the west side of the Tehuacan Valley. About 79 chips and a few choppers were from river pebbles and there were 6 basalt chips (also imported). In the east niche there were no significant concentrations of the 239 chips, but in the west niche many chips occurred in six squares roughly in the outer center of the shelter in Squares N5W5, N5W6, N5W7, N5W8, N6W5, and N6W6 indicating a flint-knapping activity area (Area 6). One pebble hammer and one worked antler occurred in the east niche, while a single hammer occurred in N6W7 in the west niche with the chips.

As previously mentioned, the most common artifacts were fine obsidian blades; only one thick flake was of a possible bullet-shaped nucleus. Most (35 out of the total of 46) of the blades had adhering striking platforms, and 4 of the chips had either ground platforms or platforms with adhering cortices, indicating that the most common chipping technique at this time was probably by propulsion. Many (101) of the blades had been snapped to serve as inset knife edges and about

10 had been bifacially pressure retouched to form artifacts, and 4 scrapers had unifacial pressure retouching. Five blades, however, had pointed striking platforms indicating indirect percussion retouching, while one had a prepared platform and five were unworked, indicating that a few were made by pressure flaking or by well-controlled percussion. It is, however, more likely that the latter technique was used in making the 19 crude blades of flint; the 4 domed and flat-topped scraper-planes might have served as cores for these.

Flint tools, however, seemed to have been made mainly by another technique. Here, initially, a pebble or block of chert or chalcedony was roughed into a flaky core by percussion blows. A few of these, with a little more chipping, became the discoidal, ellipsoidal, and (4) flaky core choppers or scraper-planes, but most would have served as cores with prepared striking platforms; 41 of the 54 chips with platforms had prepared platforms. Probably the flakes were removed by indirect percussion or pressure flaking. Most of the tools were made from these flakes so removed. The thumbnail, 5 crude discoidal, 4 thin flake end-scrapers, 4 gouges, 4 spokeshaves, and 13 side-scrapers were made by pressure retouching the flake unifacially, while projectile points and bifaced knives were made by bifacially retouching the flakes. In summary, it would appear that flint-knapping in this latest level saw only a few limited but skilled techniques being employed by the inhabitants of El Riego Cave.

Although we found tools of ground stone and shell—2 manos, 2 boulder metates, 5 discoidal beads, and a polished stone earplug—as well as tools that could have been used to make the ground stone tools—an abrader saw, an abrader hammer, and gouges—the lack of the waste products of a ground stone or shell industry in the cave suggested all ground stone tools were made elsewhere and imported into the cave. A study of these tools suggested something of the techniques of this external industry. The manos and metates were of volcanic tufa and all had been initially blocked out by sawing and then later ground into their final form. The 5 beads and earplug, all of imported jade, seemed to have been first sawed from a ground cylinder of jade, ground into rough form, and then drilled through in the center, the discoidal beads by a small-ended bit of a bow drill and the earplug by a hollow tubular hand drill. The earplug appeared to have received further polishing after the drilling. The shell pendant found was a mollusk that had been sawed into its desired form.

Closely connected with this ground stone and shell

industry was the evidence of a ground bone industry—that is, a split (deer?) bone awl and an awl made of the proximal end of a deer metapodial. The abrader saw could have been used to saw them into their desired forms and they could have been further finished by grinding them against the abrader hammer. This technique may or may not have been used by the cave inhabitants, but certainly in this case the many deer bones and fragments of large-mammal bones on the floor level could have served as the raw material for such an industry. However, we found no partially-made ground-bone tools.

The woodworking industry using similar techniques of grinding, sawing, and drilling, as well as other techniques, definitely was undertaken by the final inhabitants of El Riego Cave. Not only did we find wooden tools, associated tools of the trade such as gouges, spokeshaves, flake axes, and a flake graver, and 117 fragments of wood and 46 pieces of bark, but also a number of wooden objects partially worked or the waste products of a woodworking industry.

First, let us consider how they obtained their new material for the wooden tools. Two of the four logs had been cut down by chopping a tree trunk, first on one side and then on the other, probably by a celt (not found) or thick flake, hafted like a modern ax. Another large tree trunk had been chopped downward round and round until a pointed log was formed—probably by use of an adz or chipped stone gouge hafted like an adz.

The other log, somewhat smaller (about 4 cm. in diameter) than the others, had been removed from the tree by whittling (with a flake?) the stick or branch to a point and then breaking it off. Four other small pointed sticks and two stick fragments also had been cut in a similar manner.

The two pieces of cane, the arrow, and the atlatl dart mainshaft, one of the pointed sticks, and four other rough sticks appeared to have been initially sawed by the abrader saw into their desired forms or length.

The rectangular loom stick seemed to have been initially obtained in still a different manner. First, a log over 5 cm. in diameter was sliced or split to form a series of slabs about 1 cm. thick. The scars on the loom stick suggested the split was made by use of an adz or gouge hafted like an adz, chopping away at the log lengthwise. After this the slab was sawed into rectangular lengths (by the abrader saw) and a hole was hand-drilled from two sides through the middle of one of the longer edges (by the unifacial graver).

After having initially been cut from the tree, almost all the sticks, as well as all the artifacts, had their bark

seraped off (we found at least 16 large fragments of bark as well as the artifacts, and 98 out of 117 sticks lacking bark). After the cutting and bark seraping, what happened next varied considerably depending on the kind of implement desired.

On the simplest level, the snare required only an encircling groove cut around one end, tying the string with the slip-loop. Equally simple was the fire drill, for all that was needed here, after the initial cutting and bark peeling, was the rounding of one end of the stick by cutting or polishing so it could serve as a drill bit. Two other sticks, after being cut and the bark seraped off, received polish on one of the sides of their central shafts (perhaps by their use as a holding stick in a belt loom).

For the hafted flake ax, the handle was initially sawed to the desired length, the bark removed, and an elongate slot gouged out near one end in which the flake was inserted and cemented in place by some sort of gum. Finally, a groove was cut around the end above the hafted flake and a piece of string in the groove was tied around a small portion of the flake to hold it in place in its slot.

Projectile mainshafts were made by a slightly different process, for here *carrizo* or cane was initially sawed, not cut, to the desired length. The atlatl dart fragment was the distal end of a long mainshaft that had been seraped after sawing to accommodate reinforcing the end by wrapping string around it. The arrow fragment was of a proximal end, and the end, after initial sawing, had been further cut to form a U-shaped notch, while just above the notch an area had been seraped off to serve as bedding for reinforcement windings of string.

Plotting woodworking elements revealed no activity area or areas. This was true too of the elements associated with a leather-working industry. The two tufts of deer hair in Squares S2E5 and N2E2 were not associated with the sort of tools that would have been used to scrape the hair off hide, such as the thumbnail, the thin flake, the fine flat-topped, or the two discoidal end-serapers in the east niche, or the eight end-serapers in the west niche. Further, three leather thongs which had been made from seraped deer hide occurred in N2E2 where neither end-serapers nor deer hair were present. In fact, only one bone awl, the sort of tool used for piercing leather for leather thongs, was associated with any of this complex, the split bone awl with the tuft of deer hair in S2E5; the metapodial bone awl in S2E1 was connected with neither end-serapers, side-serapers, nor leather.

There did, however, seem to be one industry, string-

and textile-making, that occupied two definite areas in the east niche of the cave. These we have called Activity Area 7, roughly from Square E2 to Square N3E1, and, in the southeast, roughly from Square S2E5 to Square N1E4, Activity Area 8.

In this general area (S1E6) were two objects of related industries, a sandal and a fancy comb, but there was little evidence that either was manufactured in the cave. However, most (198 out of 242) of the *Agave* quids which would have yielded basic fiber materials came from the adjacent southeast string-making area. Some (4 out of 12 pieces) of the *Agave* cord came from this area, but most of it (6 out of 12 pieces) came from the northeast area. All this cord was hand-twisted first into S-twist yarns and then two yarns were Z-twisted to make cord.

Much of the cotton yarn and string was made in these two areas. Most of the yarn (82 out of 83 yarns and 8 out of 10 yarns in the cord) was Z-twisted and made on a spindle whorl. Eighty-two of the 83 pieces of cotton yarn, 3 of the 5 cotton cords, 2 of the 3 balls of cotton fibers, 6 of the 8 spindle whorls, and one of the two small pointed sticks which could have served as a shaft of a spindle whorl were all in these two areas. Thus the probability is extremely high that this was where the cotton yarn was spun and the string manufactured.

There was also some evidence that some weaving of the cotton yarn was done in the southeast area, for here we found six of the nine textiles, both of the polished sticks that may have been loom holders, the rectangular loom stick, the split-bone awl that could have served as a weaving pick, and the comb that could have served as a weaving comb. These textile specimens (3 of the 6) were predominantly plain weave, closely-woven, and of cotton; however, one of the plain-weave fragments was not so closely woven nor was it of cotton. The other two specimens from the southeast area were of the weft and warp cording technique. Here the loom with single warp strands was used in the plain weave, but a number of weft strands (2 or more) were woven through it. The other three specimens occurred outside the southeast area; a plain-weave fragment and a semi-basket-weave fragment in the northwest area and a plain-weave fragment in Square E2.

Thus, one sees the usual number of mundane activities carried on by the last inhabitants of El Riego Cave, but with the impression that one of their most important functions was of a ceremonial nature. As mentioned previously, a small portico had been constructed in a red-painted plastered depression in front of an

interior red patio with a hearth located in front of a Xipe Totec xantil. Certainly, rituals and rites must have been undertaken in association with these inter-related features, and from the seven burials one might infer that they involved some sort of complex burial practices. Five of the burials were in one large conoidal pit about 1.4 meters in diameter with its center at N5.5W11.6 (Area 1-3) with a maximum depth of about a half a meter. The grave pit had been dug through the red plaster floor. The fact that Burials A, C, D, and E in part overlap each other suggests that all were buried at roughly the same time and in the same ceremony. Burial A was put in the pit first. It consisted of the pelvic girdle, vertebrae, rib cage and two arms of an adult female, along with a hemispherical bowl of Coxcatlan Brushed. The position of the bones, the association of radius and ulna, and the alignment of vertebrae and pelvis, suggest that the torso with the arms was put in the pit before the flesh had rotted from the bones and after the skull, legs, and so forth had been removed from the body. The relationship of the bones, particularly the pelvis, to the bowl suggests that this armed torso was seated in the pit and put in the pit in an upright position, and then fell or was pushed eastward onto its left side at about the time Burial E was put in the pit. Burial E was the aligned portions of the two legs (femora, tibia, and fibia) of a cremated elderly arthritic male, overlain by the vertebrae and skull. This was placed in the pit in a hemispherical outangled-rim bowl of Coxcatlan Gray just east of Burial A. Next, the intact body of an adult male (Burial C) was seated facing north, to the west of Burial E, and in his pelvic area were placed the jaw and hand bones of another adult female (Burial D), while deposited to the east of him was an incurved-rim bowl, an outflaring-rim bowl, and an outangled-rimmed hemispherical bowl of Coxcatlan Brushed. Later, Burial C, the seated adult male, slumped southward onto its back. About the same time that the above was going on, the body of a young adult female was placed in a sitting position facing north in the pit just south of Burial A. Later her skull with a badly fractured occipital region (which could have caused her death) was placed in her lap upside down and facing west. Finally, the pit was filled up and the burials covered.

All in all, the burial practices were varied and complex and suggested that other ceremonies preceding the burials were even more complex and grisly. After all, an adult female (Burial A) had to have her hands, head, and legs cut off (perhaps initially killed) at about the same time an old man (buried dead or alive



Fig. 20. Burials A-E of Layer 1 of Tc 35w, as seen from the north.

in Burial E) was being burned and another young female (Burial B) was having her head bashed in and then cut off. These practices, perhaps all accompanied by rites and rituals, would have occurred about the same time the young adult male (Burial C) was being prepared for interment along with the collected bones of still another female. Only after all this had been done could the burial ceremonies commence.

Our information on the other two burials is not quite so informative. Burial 1:1 was in a small pit in the west niche in Square N8W8 and consisted of fragments of the then 6-month-old infant's skull, teeth, and some long bones. It may have been originally a flexed burial, but it was disintegrated and it was difficult to tell. Burial 1:2 was in another niche in the back of the cave at N6W12 near the large burial pit. It consisted of a few burned fragments of long bones and pelvis

of an adult female in a small ash pit about 30 cm. in diameter and 10 cm. deep. It would appear that this cremation actually took place in the cave. Both the burial rites in the cave and the death or sacrificial rites that must have preceded them must have been directed by individuals of special status—certainly not peasants or slaves.

Not quite so striking but of a very special nature with ceremonial implications were the four caches of special ceramic vessels in the cave. The largest one of these caches was in Square S3E2 (literally a small cave in a pillar within the east cave) and consisted of six tripod bowls, two ollas, two tops or plates of ollas, some beans in a footless hemispherical bowl, and a piece of gourd burned on the interior, perhaps indicating that it served as some sort of burnt or burning offering. The relationship of the vessels to each other

and the carbon in their interiors suggested all had had offerings that had been burnt. The northeastern offering at S2.25E1.8 consisted of two tripod bowls of Coxcatlan Gray, one upside down on top of the upright one, with cemented ash in their interiors. The northwestern offering was a Black-on-orange hemispherical bowl (perhaps a trade pot of Coxcatlan Black-on-orange) with beans and ash in its interior. In the middle of the cache were topped ollas. The eastern one was an olla of Isla de Sacrificios Polychrome topped by a sherd of a bowl of Texcoco Red-on-black with ash in its interior, while the more central one was an olla of Quachilco Mica capped by a comal of the same type that had ash and burned bee or wasp hive in it. The southern two offerings consisted of a Coxcatlan Gray tripod bowl upside down on top of an upright tripod bowl of Coxcatlan Brushed to the west and, to the east, a Coxcatlan Gray tripod bowl over a tripod bowl of Cholula Polychrome Lacquer. These offerings also contained ash and earth, and flotation revealed the latter offering had some sort of burned gum in it. There was also, in the middle of the next square, a tripod bowl of Cholula Polychrome Lacquer topped by a sherd that had charcoal in its interior. This seemed to be a separate cache but its function may have been the same as that of a third cache consisting of fragments of two Coxcatlan Gray bowls (probably one on top of the other) at S2.85E4.50 which contained ash and burned chili ("chilis tostados" in the notes) and a burned bean. The other cache at N6.13W5.43 was a little different in that both bowls of Cholula Polychrome were right side up and side by side with nothing but dirt in them. It might be added that a fragment of Mixtec Polychrome occurred in the same square as this latter cache. In summary, we do not believe that these caches of vessels were basically connected with such mundane functions as storage or food production, but were of a special, perhaps ceremonial, nature. We have reached this conclusion, for most of the pots were decorated, many were imports, and most seemed to have contained foodstuffs purposely burned but not cooked. It might be added that there may have been still another cache where a decorated comb and sandal (or sandals) occurred together in Square S1E6. These were fairly near the jade earplug, beads, and figurines.

All in all, there seems to be considerable reason to suspect that occupation of the floor of Zone A had as one of its main functions religious or ceremonial activities. The evidence for this conclusion would be the specially-built portico with its painted patios and

associated hearth and xantil, the burials that indicate a whole series of grisly burial practices and rites, the special cache with indications of burning or burnt offerings, and various artifacts of a ceremonial or decorative rather than a practical nature. Artifacts representing other mundane activities, of course, did occur, for even full-time specialists or ceremonial practitioners had to eat.

The artifact types indicated that this specialized occupation be considered a component of the Venta Salada Phase. The proportion of pottery types and the stratigraphic position of Zone A are indications that it must have occurred close to the time of the Spanish Conquest of Mexico.

Other Sites Tested

In hopes of finding early pre-ceramic remains along with preserved perishable remains like those found in the upper layers of Tc 35, we tested a number of caves in the El Riego cliffs. The most promising cave was Tc 39 on the north edge of the cliffs, directly south of a hacienda then called Casa Blanca. This cave was seen in 1959 by Edwards and MacNeish and was one of the reasons for Peterson's and MacNeish's intensive survey of the locality early in the 1961 season. At that time we gave the site a number and made a surface collection that included a Lerma point. Testing, however, was delayed until January 1962 when we were preparing the "big push" of the second season.

Tc 39

Tc 39 faces north and is about 12 meters wide with a maximum depth of about 3 meters. Large slabs indicated that much of its roof had fallen in; it might have sheltered at one time an area 6 meters deep and perhaps 20 meters wide. After making a rough contour map of the immediate area we set up a one-meter-wide trench extending north from the interior down the talus in front of the cave for 6 meters. The innermost square had about 20 cm. of refuse over a 1-cm. layer of ash that lay directly on the rock floor of the cave, so we concentrated our efforts on the five squares in front of it. We dug the trench in alternate squares, S2E1 and E1 first and then S3E1, S1E1, and N1E1. Only the southernmost Square S3E1 had any semblance of stratigraphy. The ash floor, at about a 20-cm. depth, continued into the square, but beneath it, as in all the other squares, a uniform mass of unbedded brown soils contained many slabs from the roof, so we abandoned our normal technique of stripping natural strata and dug all squares at arbitrary 20-cm. levels.

The rock floor of the cave was irregular, but one square (S1E1) was sunk to a depth of 180 cm., while in the other squares the floor was encountered at progressively lesser depths as we moved north and south.

Because of the lack of well-defined stratigraphy and the lack of preserved vegetal remains, the test was abandoned at the end of the week, and for a considerable length of time the artifacts were treated as if they were a surface collection (see Vol. 2, Tables). Later, however, they were laid out in terms of their arbitrary levels and some general trends were noted that indicated a sequence of occupations which we had not been able to discern. The lowest levels 8 and 9 contained a few chips, a piece of deer antler, a Lerma point, thin unifaces with one lateral edge utilized, a thick uniface with two lateral edges utilized, and a long, flat flake with one short end retouched (end-scrapers?). Although the sample was very small, this assemblage of artifacts suggested some sort of an Ajuereado occupation or occupations, and the deer antler might be interpreted as indicating that at least one of the occupations occurred in the winter season. Further, the point and the deer antler suggested a hunting activity.

The levels above, 7 and 6, were equally nebulous, but there was a suggestion of an El Riego occupation or occupations (El Riego and Tortugas points, 2 scraper-planes, ellipsoidal chopper fragments, and 2 possible side-scrapers found in Level 7). Level 6 had even fewer artifacts—a Tilapa point and a multi-faceted scraper-plane—but in two squares, S2E1 and S3E1, heavy concentrations of chips and cores suggested some sort of Coxcatlan chipping station. However, lest we jump to unwarranted conclusions, we will mention that a Postclassic sherd of Coxcatlan Brushed occurred at this same level in Square E1.

Levels 4 and 5 had some artifacts indicative of an Abejas occupation or occupations. An Abejas and a Catan point were found along with a small bifacial disk, crude blade fragments, and chips. However, again there were eleven Postclassic sherds in these levels. The upper three levels had fewer artifacts, a metate and a thin side-scrapers and chips, but a fair number of sherds (73), including 9 Coxcatlan Brushed, 4 Coxcatlan Coarse, 2 Coxcatlan Polychrome, 3 Coxcatlan Red-on-orange, 3 Coxcatlan Gray, and a Coxcatlan Striated Buff. This seemed to suggest some sort of Venta Salada occupancy. All in all, stratigraphy was almost non-existent, artifact trends not very convincing, and there were no preserved plant remains, so upon completion of the trench we abandoned the site, ex-

cept for a brief return with Education Services, Inc., then of Watertown, Massachusetts, to make a movie.

Tc 34

The other caves tested were equally unsatisfactory. Directly west across the arroyo from Tc 35 was Tc 34, a small cave about 9 meters wide at its mouth and 6 meters deep (east and west). On a Friday in May 1961 we sunk a one-meter test square to the floor at a depth of 70 cm. In this square we uncovered five distinct ash zones containing preserved plant remains and capped by charcoal floors. Artifacts were not numerous, but the lower three zones (C, D, and E) had 10 El Riego Gray sherds suggesting a Palo Blanco occupation. The upper two zones had very few Palo Blanco and Venta Salada sherds. We left a piece of cotton cloth found in Zone B in the profile when we quit Friday night; when we returned Monday we found the cloth gone and our trench extended clear across the cave by looters. The looters had broken into the only two burial niches in the back of the cave and scattered the bones and the broken artifacts over the cave floor. This was enough to discourage further endeavors by our group. We would guess that the cave had been first occupied in El Riego times, for we found a crude blade, a flake chopper, and a Trinidad point on the surface. The sherds from Zones C, D and E indicate that the next occupation was in Palo Blanco times, while the sherds from the top two zones and the looted burial niches suggest a Venta Salada use of the cave—enough said!

Tc 266

Another equally discouraging excavation was attempted in Tc 266, just around the corner and to the east of Tc 35. It was a dark deep cave (10 meters), relatively narrow (6 meters), with a narrow mouth (3 meters) opening to the east. We sank an east-west trench one meter wide and three meters long with limited results. The two east squares (E1 and E2) had only about 40 cm. of refuse. These and the top part of Square 0-0 had a hard-packed brown loam layer. Late Venta Salada sherds occurred in Zone A (18 Coxcatlan Brushed, 15 Coxcatlan Gray, 11 Coxcatlan Red-on-orange, 10 Coxcatlan Polychrome; 7 Coxcatlan Coarse, 4 Coxcatlan Red, 4 Coxcatlan Red-on-cream, and 86 unidentified sherds), as well as a fine blade, corn cobs and leaves, mesquite seeds, grass quids, an avocado pit, a bean, a squash rind, a cotton ball, 8 *Agave* quids, an *Agave* leaf, and wood. Underlying this zone in all three squares was a thin charcoal

layer over about 10 cm. of ash—Zone B. It seemed this occupation also occurred in Late Venta Salada times; it contained 16 Coxcatlan Brushed, 6 Coxcatlan Coarse, 5 Coxcatlan Gray, 3 Coxcatlan Red-on-orange, 2 Coxcatlan Red-on-cream, 2 Teotitlan Incised, and 45 unidentified sherds, as well as a Starr projectile point, chips, bones, string, corn cobs and leaves, and a chupandilla pit. In Square 0-0 and the western part of Square E1 a similar underlying layer, Zone C, revealed other Late Venta Salada artifacts including 15 Coxcatlan Brushed, 5 Coxcatlan Gray, and 19 unidentified sherds, as well as a mano, a blocky core, corn cobs, *Agave* leaves, chips, and bones. Underlying this zone a yellowish layer composed of disintegrated travertine, rocks, and ash (Zone D) extended to a depth of 70 cm. in Square 0-0 but only to the bottom of the other two squares at a depth of 40 cm. Zone D contained chips, a Nogales and a Catan point, and a pebble chopper. It seemed to have been some sort of Abejas occupation, but since it had neither a well-defined floor nor plant preservation the test was stopped.

Tc 267

In spite of discouraging results in Tc 266, we tested an even smaller cave 100 meters farther north along the El Riego cliffs. Tc 267 was 6 meters deep and 7 meters wide. The talus was littered with flint chips, the edges of its floor showed stucco, and preservation of plant remains was obvious. On January 11, 1962, we sank a 2-meter-long, 1-meter-wide test into its mouth. Unfortunately, layers were not well defined and a jumble of rocks with refuse lay between them. We dug three arbitrary 20-cm. levels into it before we gave up. We uncovered 33 sherds, 6 of which were Coxcatlan Brushed, and a mano fragment, a flint, a pumpkin or watermelon seed, *Agave* leaves, wood, and twill pieces of cloth of wool.

Tc 268

Late in the afternoon of the same day we began testing Tc 268, a shelter about 50 meters farther north of Tc 267 on the south wall of a small canyon. Our plan was to dig a three-meter-long trench about one meter wide by the alternate square technique. Thus we began in two squares, one to the north called Test 1 and one to the south called Test 2, leaving a one-meter square in-between. The top layer (Zone A) of goat and bat dung of both squares was about 20 cm. thick and overlay Zone B, a 5 to 10-cm.-thick layer of vegetal materials over 10 cm. of ash. It contained about 40 Late Venta Salada sherds (4 Coxcatlan Polychrome, 7 Coxcatlan Gray, 13 Coxcatlan Brushed, and 16 un-

identified sherds) as well as corn cobs, a point tip, a gourd shell, a knotted *Agave* strand, and other plant remains. Underneath the ash in both squares was another vegetal layer, Zone C. At about 40 cm. deep in Test 1 we found a piece of basket-woven cloth, a piece of a woven tump line, and cotton cordage that were obviously covering a burial. We therefore abandoned this square and took out the vegetal layer only in the south square to a depth of about 60 cm. The artifacts of Zone C indicated that it was also of Late Venta Salada times, for we uncovered about 20 Coxcatlan sherds, a dozen Coxcatlan Cray sherds, as well as about a dozen unidentified ones, along with corn cobs, *Agave* leaves, gourd rinds, shells, and flints. Continuing in the southern square, we found a brown sterile layer (Zone D) overlying the cave floor in the northern part of the square. The southern part revealed a skeleton in a pit that had been dug down from Zone C. That did it! Apparently the whole floor of the cave was covered with Late Venta Salada burials, and the time-consuming task of uncovering them was just not in our ground plans for the 1962 season. And so we concluded our testing and excavations in the El Riego Locality.

Summary of the Cultural Sequence in the El Riego Oasis Locality

Although we made only one excavation with abundant materials and our information yielded through tests and survey was relatively meager, there is still ample evidence that this unique oasis-like environmental zone was utilized in a manner rather different from our other localities in other micro-environs.

On the earliest phase level, Ajuereado, the way of life of the microband in the El Riego Oasis was not unlike that in other regions in that the greatest emphasis was on hunting and associated butchering, bone and/or woodworking, flint-knapping, and skin-scraping activities. However, unlike other micro-environs (the humid river bottoms excepted) that were exploited in a number of different seasons, the El Riego Oasis apparently was occupied only (or mainly) in the winter and/or the spring. This difference in seasonality became more marked in the following El Riego Phase. Microbands continued to exploit the lush environment in a similar manner seemingly only in the dry winter and/or spring season or seasons. Elsewhere in the valley, however, except again possibly in the humid river bottoms, populations fluctuated from microbands to macrobands with the seasons, and a number of new subsistence activities came into being with a general de-emphasis on hunting and a compensating increase

in plant-collecting and many other kinds of activities.

Later, in Coxcatlan and Abejas times, while larger groups were exploiting other parts of the valley for increasingly longer periods of time and were engaging in many new types of activities (including the increased use of the all-important wet-season activity, agriculture or horticulture), the El Riego locality was still being utilized by small groups hunting in the dry season. It almost seemed as if the El Riego Oasis had become a refuge area where small groups of peoples came to hunt only after they had been forced out of other areas and compelled to halt their normal activities by some dire circumstance, perhaps drought or lack of food surpluses.

During the next two millennia, that is, the Purron, Ajalpan, and Santa Maria Phases, this spring-fed environment seemed to have been utilized not at all, or else in such a casual manner that we could not discern it. Elsewhere in the Tehuacan Valley there were major developments; full-time agriculture, village life, and ceremonial centers were coming into being. The El

Riego Oasis seems to have been where the action was not.

It was not until Palo Blanco times that this zone was utilized again, but still mainly by small groups and for relatively short periods. However, while elsewhere in the valley towns were being built and organized, in the El Riego Oasis with its life-giving springs, the region and its caves were taking on a sacred aura, as suggested by the many burials and other factors. And there is little doubt that in Venta Salada times the El Riego Oasis and the caves, unlike other caves in other localities at this time, had a special religious and ceremonial importance, probably different from the ceremonialism and sacred aspects connected with the shrine, ceremonial plazas, temples, and other religious manifestations in other parts of the valley.

Partly because of its perennial springs, the El Riego locality had a relatively unique history; still it remained a part of the cultural development taking place in the whole region of the Tehuacan Valley.



CHAPTER 3

Excavations in the Lencho Diego Locality in the Dissected Alluvial Slopes

Richard S. MacNeish and Angel Garcia Cook

THE ARROYO LENCHO DIEGO is found in the southeast part of the valley where the deeply dissected alluvial slopes have resulted in the narrow canyons typical of this ecological niche (Subarea 4; cf. Vol. 1 of this series, p. 139). Located about half way between the hamlet of San Raphael and the town of Tilapa, the arroyo rises in the southern and southeastern flanks of Cerro Chichiltepec and flows sinuous-

ly southwestward through hills and mesas composed of alternating cretaceous beds of sandstone and limestone interspersed with lenses of gypsum. The last two to three kilometers of its westward flow, its bed cuts through the relatively flat alluvial terraces of the Rio Salado and enters the river at about the border of the states of Oaxaca and Puebla. East of the Tehuacan-Teotitlan highway there is a sharp turn to the south

where the arroyo cuts steep cliffs in the limestone and sandstone beds; above this change in direction a small side arroyo, Abejas Canyon, enters from the north and houses Abejas and Purron Caves. This part of the valley, with silt and sandy soils, is relatively level and untterraced, and ranges from about 100 meters to almost 4 km. in width. In the upper reaches where it has cut through the Jurassic beds of the mountains, the arroyo is at a very steep gradient, and its erosional bed is neither deep nor more than a few meters wide.

The Narrow Canyons and Dissected Alluvial Slopes Zone is one of the warmer parts of the Tehuacan Valley. Here the mean annual temperature is about 25° centigrade, with ranges from about 4° in the coldest month of the winter to about 45° in the hottest month of the summer. It is also one of the drier parts of the Tehuacan region where the amount of rainfall usually ranges between 500 and 800 mm. per year. No permanent water flows in this part of the valley; however, raging torrents of predominantly run-off water occasionally occur during the May-June or September peaks of the wet season. Vegetation is sparse, with a scattering of lechugilla, mala mujer, tetecho (*Cephalocereus hoppenstedii*), prickly pear cactus (*Opuntia*), *Hechtia* spp., organ cactus, *Echinocactus*, *Myrtillocactus*, pochote (*Ceiba parvifolia*), some low thorn vegetation (*Prosopis*, *Acacia*, and *Leucaena*), some maguey (*Agave*) and little, if any, grasses (*Setaria*). Faunal remains include white-tailed deer (*Odocoileus virginianus*), *Lynx rufus*, striped skunk (*Mephitis macroura*), Audubon cottontail (*audubonii*), gophers (*Cratogeomys* spp.), kangaroo rats (*Dipodomys philipsii*), spiny mice (*Liomys irroratus*), deer mice (*Peromyscus* spp.), cotton rat (*Sigmodon hispidus*), gray fox (*Urocyon cinereoargenteus*), spotted skunk (*Spilogale augustifrons*), a few birds, and racerunner lizards.

The climate and the flora and fauna are relatively uniform throughout this micro-environment; still, the topography and geomorphology allow for three natural subdivisions. One is the relatively level sandy and gravelly terraces of the arroyos themselves. Another subdivision is the slopes of the canyons where most of the rock shelters are found. The final subdivision is the tops of the surrounding hills and mesas. In excavation we confined our activities to the arroyo terraces and the slopes of the canyons and found occupations in all periods. However, survey revealed that the mesa tops were also exploited, but only in Palo Blanco and Venta Salada times. Although there is little reason for subdividing the locality on the basis of ecological factors, cultural factors (as will become apparent in

the survey chapter) warrant dividing it into two major sections, the hilltops and the canyons.

Generally speaking, then, whether it was the tops of the hills or the bottoms of the canyons, this locality was not an inviting one. Nevertheless, with irrigation, agriculture was as feasible year round as it was during the brief rainy season. Some of the wild plants were edible, particularly during the spring and the wet season, and game was relatively easy to find during the dry season. Boulders and pebbles were the materials for making chipped and ground stone tools. The hilltops and mesa tops offered easily defended site locations. Thus, the area, despite its austerity, had some natural inducements for occupation, at least for short periods. In fact, our investigations revealed a long sequence of just this type of short-term occupation and gave us further insights into the manner in which the ancient Tehuacanos exploited this particular ecological niche.

Our first entry into the region was early in February 1961 when Peterson and MacNeish were guided to the cave of a reputed bandit, Lencho Diego by name. The cave was probably a colonial gypsum mine. During this initial reconnaissance we discovered Tr 15 and Tr 67; survey did not occur again until November 1961 when Peterson explored the area more thoroughly. Sites Tc 272, Tc 273, Tc 274, Tr 275, Tc 307, and Ts 365 were recorded and then tested by MacNeish in January 1962. A month later our first major excavations began in Purron Cave (Tc 272) under the direction of Angel Garcia Cook and MacNeish, and continued under the direction of Angel until the end of May. MacNeish and Arbide began excavations in Abejas Cave (Tc 307) in March and Arbide finished work in that cave in late April and early May. At that time MacNeish further tested Ts 365. In April 1963, further excavation in Purron Cave took place during the production of an educational movie. The final endeavors occurred in the spring of 1964 when Woodbury and Neely investigated Purron Dam (Tr 435) (see Vol. 4 of this series, Chap. 3) and when Brunet studied the geology of the locale (Vol. 1, Chap. 5).

Purron Cave

About 100 meters north of the junction of Abejas Canyon and Arroyo Lencho Diego a small box canyon enters the former from the west. Its upper arm runs north and south 100 meters in front of Purron Cave before it bends and flows eastward 300 meters to enter Abejas Canyon. The south and west sides of Purron Canyon are extremely steep and covered with organ cactus, lechugilla, *Agave*, and mala mujer trees. The

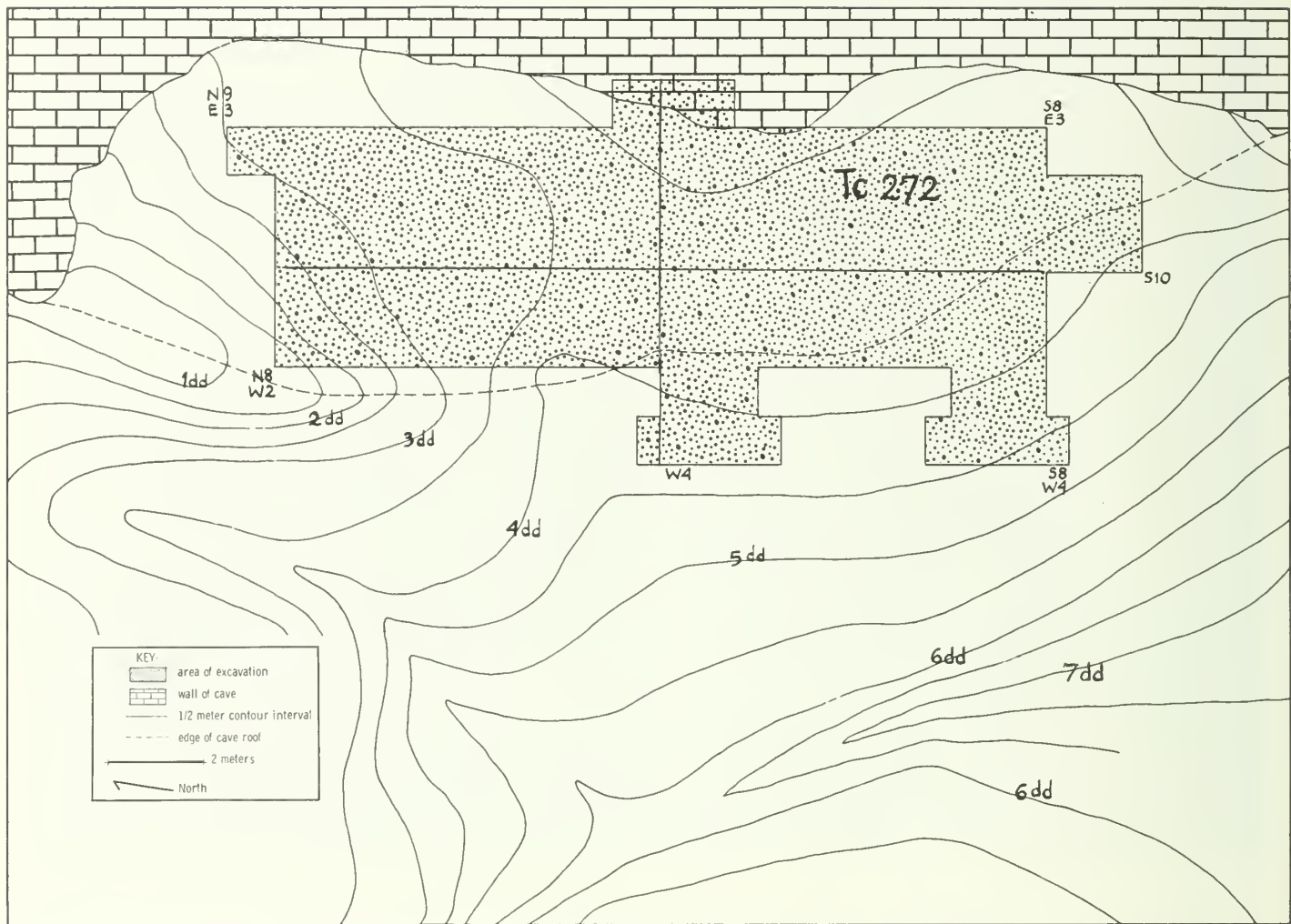


Fig. 22. Contour map of Purron Cave, showing area of excavation.

upper portion, about 50 meters wide with a 1-meter-deep gully, has a more varied topography than the lower portion. Rising from the east side of the gully, a steep talus slope is covered with mesquite trees, organ cactus, and lechugilla. Above the talus is a vertical sandstone cliff about 10 to 50 meters high. The round top of the hill is again covered by organ cactus, lechugilla, *Agave*, and mala mujer trees. This cliff contains Purron Cave, just before the arroyo flows eastward. The cave and cliff are oriented in a northeast-southwest direction roughly parallel with Abejas Canyon. The lower three-quarters of Purron Canyon gradually widens, flattens out, and blends into the alluvial terrace that flanks Abejas Canyon. This lower portion is covered by a dense stand of mesquite trees, mala mujer bushes, and organ cactus. Water is not available near-

by, although a few seeps do exist in Arroyo Lencho Diego about 2 kilometers east. These at one time might have flowed down the whole canyon. Purron Canyon is extremely hot during the day and, usually in the late afternoon and during the cold nights, there is a strong wind which blows dust up through the canyon. None of these factors seem to have made it an ideal living place. Nevertheless, Purron Cave was frequently occupied.

The shelter itself is located in the extreme northeast section of Purron Canyon at the bottom of a 30-foot cliff and above a steep talus slope about 2 to 4 meters in elevation. The cave is a long shelter (about 26 meters) facing west with a maximum depth in the northern portion of about 7 or 8 meters. It ranges in height roughly from about 5 meters in the southern

portion to ground level at its north end. The floor of the southern three-quarters of the cave is relatively level, although, when we first found it, it was littered with large slabs which had fallen from the cave ceiling. The northern quarter of the floor gently slopes upward to connect with the downsloping cliff. It offers shelter from most rains and the morning sun, but not the afternoon dust storms. It could quite comfortably (?) house four or five nuclear families and keep them hidden from the animals and the main traffic in Lencho Diego Canyon.

In our excavation in January 1962, MacNeish and his "blitz crew" of six men tested this cave. Initially a 1-meter square (Test Square 1) with its four corners at S1.25W.6, S2.15W.3, S1.9E.65, and S.8E.4 was dug by 20-cm. arbitrary levels to a depth of 1 meter. Specimens, however, were bagged as to zone whenever possible. At least three distinct zones (A, B, and C) were discernible in the four walls of the square. The bottom of the square was then dug down into the top of another heavily-burnt stratum, Zone D. Obviously the stratigraphy was deeper than 1 meter, and we extended the trench 1 meter to the northeast into Test Square 2 (to S.6E1.3 and S1.5E1.6) and 1 meter to the southwest into Test Square 3 (to S1.55W1.5 and S2.5W1.2) by horizontally stripping off actual zones from the vertical faces of Test Square 1. This was done so that we could conveniently dig Test Square 1 to a depth of 2 meters by the arbitrary 20-cm.-level technique. Much of the refuse from the deeper digging of Test Square 1 was charcoal-burned earth, fire-cracked rock, and vegetated materials. It was obvious that we were digging in a pit that had been dug down through other layers of refuse. Thus, in order to find these layers of refuse we dug into Test Square 2, stripping off zones as seen in the northeast wall of Test 1 until we reached a depth of 2 meters. Sure enough, at the northeast end of our 3-meter-long trench we could see twelve distinct zones of refuse capped by charcoal floors. Obviously the refuse went still deeper, but large amounts of rockfall on the bottom of both Tests 1 and 2 at a 2-meter depth indicated that we should extend our trench 1 meter farther northeast to points S.2E2.35 and S1.2E2.65 (Test Square 4). The twelve archaeological zones were stripped off from the vertical face of the northeast end of Test Square 2 to a depth of 2 meters, then Test 4 was dug by 20-cm. arbitrary levels to a depth of 3 meters. For convenience in removing dirt, a step into Test Square 5 was also dug to about 50 cm. at the southwest end of the 4-meter trench (to points S1.8W2.4 and S2.6W2.2).

We now had a trench 5 meters long and 1 meter

wide that stepped downward to a depth of 3 meters in its northeast end. In its far east end 17 different zones were readily discernible and there were some artifacts and some preserved plant remains in each. Obviously this cave was worth a major excavation effort; it was time to study the zones in the vertical walls of the trench, the profiles of the trench, and the materials found in excavation as a means of determining what our overall excavation strategy should be.

The zones were named and tagged from A to P and the trench and staking system were reoriented so that the walls of the excavations would give better cross-sections of the cave. The surface was cleared of loose rock and the floor of the cave staked out into 90 1-meter squares, oriented along the cardinal axis. Datum depths were taken on each stake as well as the area surrounding the cave so that a contour way could be made. We decided to excavate the cave in two large blocks, each from two vertical profiles, and to do so we had to dig two large cross trenches. One of these trenches was at the edge of the cave floor and the talus where our initial test trench indicated that the zones to the east were either indistinct or completely indiscernible. It was initially dug from the southwest wall of the test trench into Squares S3W1 and S2W1 by stripping off zones from the vertical face to a depth of one meter. Up to this time we had kept a daily diary of the excavation of the initial test trench and profiles of the 4 walls of each square we had drawn; we now began a more formal recording of each square excavated which gave complete details of the content of each zone dug in each square. These were called square descriptions. The daily diary now became a mechanism for coordinating the zones of each of the squares, as well as a means for describing the culture of the zones and recording speculation about the significance of the finds. Further, large rolls of graph paper were prepared for each 1-meter axis of the grid, both the 6 east and west axes as well as the 17 north and south ones. After the 4 walls of each square were dug to a 1-meter depth, the various zones and features were drawn upon their 4 respective long axis sheets using a scale of 20 cm. to 1 meter. Each of the long walls of the east-west profiles was also photographed.

Next, we began to push our trench between W1 and W2 north and south by digging S1W1 and S4W1. Zones were stripped to a depth of 1 meter while at the same time the earlier Squares S3W1 and S2W1 were dug by the same technique to a depth of 2 meters. Recording the data was done in the manner previously described. Using such a system the trench between



Fig. 23. The south E3 profile (left) and east part of S8 profile, showing the zones of Tc 272.



Fig. 24. The alternate square excavation technique in the south end of Purron Cave.

W1 and W2 was eventually pushed southward to S8 and northward to N8. The 2 north-south walls W1 and W2 now gave a long profile of the cave down to depths of 1 to 2 meters. The easternmost profile W1 revealed 10 or 11 zones but farther west at W2 most of these zones were no longer discernible.

While this north-south trench was being excavated, we began excavation of an east-west trench so that most of the cave floor area was now divided into 2 blocks. Initially six squares were dug north and south of the original test trench. To the south Square S3 and to the north S2 and S1 were dug to a depth of 1 meter by stripping off zones from the profiles of both the W1-W2 trench as well as from the original test trench. Square S1E2 to the north was also dug to a depth of 1 meter from the original test trench, as were S2E2 and S3E2. Squares S2E3 and S2E1 were dug to a depth of 2 meters by stripping zones from the initial test trench. After recording the data from these squares we dug the alternate squares of this 3-meter-wide, east-west trench. Squares S1E1 and S3E1 were dug to a 1-meter depth by stripping off the zones from the three sides, while Squares S1E3 and S3E3 were dug to the same

depth by stripping from two adjacent profiles. S2 and S2E2 were dug to a depth of 2 meters from the original trench walls.

We continued down in the same manner, first taking Squares S3, S1, S3E2, and S1E2 to a depth of 2 meters and S2E3 and S2E1 to a depth of 3 meters. Next, Squares S1E1, S3E1, S1E3, and S3E3 were dug to 2 meters and then S2 and S2E2 were dug to a depth of 3 meters. The trench was completed when the north and south parts were excavated to a depth of 3 meters. Again, alternate Squares S3, S1, S3E2, and S1E2 were dug first and then the in-between Squares S1E1, S3E1, S1E3, and S3E3.

Now we had a complete 3-meter-wide and 3-meter-deep trench east to west from the interior to the exterior of the cave (see Fig. 25, Stage 2). We re-labelled the zones with small tags, checked our 0 and S3 profiles, and took photos of the complete profiles. Since the north-south trench at the western edge of the cave was completed to a depth of 2 meters we were ready to begin attacking the north and south blocks in earnest.

Our initial efforts were on the northern block. We re-

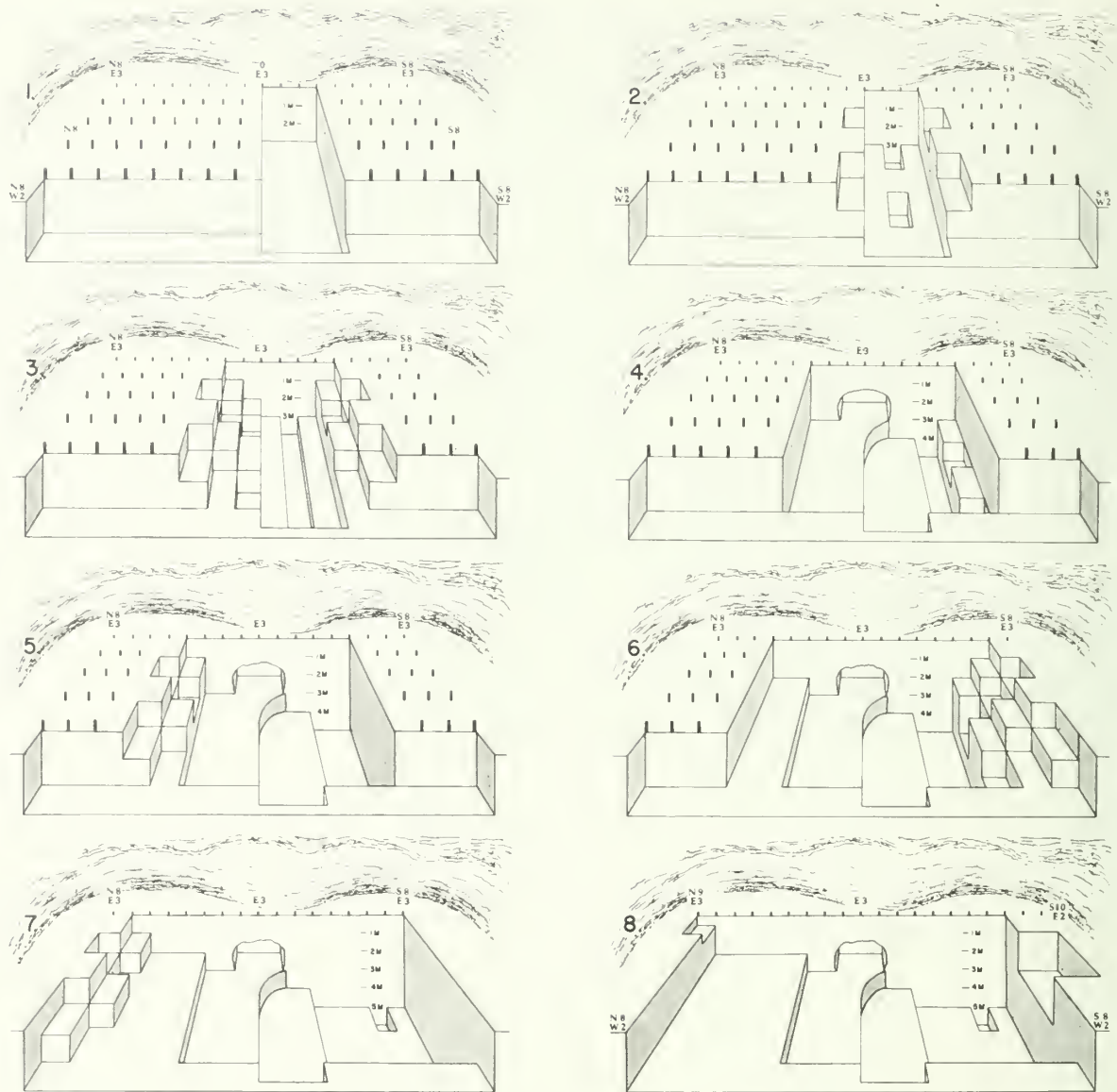


Fig. 25. An isometric drawing of the eight stages of the excavation of Purrón Cave.

moved the 0-0 and E2 Squares and then the E1 and E3 Squares to depths of 1 meter, giving a profile 1 meter deep and 4 meters along the N1 axis. Next we moved northward, first digging N1 and N1E2 to a depth of 1 meter as well as E1 and E3 to a depth of 2 meters and then removing the in-between alternate squares giving us 2 profile steps, one to a meter depth along the N2 axis and on another from 1 to 2 meters along the N1 axis. Finally, a third tier from 2 to 3 meters in depth was opened by digging alternate squares for our excavation on each of the 3 1-meter levels. Eventually all were brought forward to the N3

axis so we had a 3-meter-deep face, 4 meters long (Fig. 25, Stage 4).

While this was going on, burials were found in the back of the cave at depths from roughly 2 to 3 meters in about Squares E4 and S4E1. These were carefully excavated and recorded on our burial sheets. Again, while this was going on, we began excavating to the south by the same technique, deepening our trench first to 4 meters and then 5 meters and getting a long face, 4 meters wide and 5 meters deep at the S5 profile.

Next we moved north again on 2-meter tiers by the same technique to give us a 2-meter-deep large cross-

section along the N5 axis (Fig. 25, Stage 6) and then eventually along the N8 axis (Fig. 25, Stage 8). The next to last excavations were in the south portion of the cave, resulting in a 5-meter-deep profile along the S8 axis as well as a test square in Square S7E2 to a depth of 6 meters. The final excavations in the cave in 1963 were for cinematic purposes and at this time we dug Square N8E2 to about a 40-cm. depth as well as 4 squares, S9E1, S10E1, S9, and S10, to a depth of 3 meters. Little was found in these, other than what we planted for audio-visual purposes. The idealized isometric drawings of Fig. 25, in terms of 8 stages from our first cross-trench to the end of excavation, illustrates our general techniques far better than words.

The above system of excavation gave us great control of the stratigraphy and we were able to determine rather exactly the extent, thickness, and content of each of the 28 stratified archaeological zones. Further, this system not only gave us good vertical control but it also gave us excellent horizontal control. Thus, each artifact, alluvial feature, and ecofact found on each floor could be recorded and plotted rather accurately. A study of these data gave us a sound basis for reconstructing the way of life of each of the 28 zones, and, by means of the Cal. Comp. line plotter, we can illustrate rather neatly the artifacts, their distribution, and association, as well as other features, on each floor of Purron Cave. In the following sections then, we describe the sequence of ways of life that occurred in each of the stratified zones. These we have outlined in Table 3.

The Way of Life of Zone U

Our earliest evidence of human occupation in Purron Cave occurred about 5 meters below the present surface. The strata originally seemed to have been formed by sandy and gravelly soils washed into the cave, perhaps during a set of storms or during a rainy season or seasons. After the stratum had been deposited to a depth of at least 1 meter, a portion of the top of the stratum was packed down over an area about 3 by 4 meters, that is, from S3E3 to S8E3 to S8W1 and S5W1 to S5E3. The almost complete lack of evidence of burning on this thin floor means that the occupation must have been very brief and that the transients had no time (or need) to build a fire. They ate the ground seeds raw. The small area (only 2 square meters) indicates that the group must have been a very small one. The single (large) flint flake and mere two fragments of metate-milling stones tend to confirm this, particularly since they occurred in only one square, S6E3, along with a lone cobble. The milling stone sug-

T A B L E 3
Sequence in Purron Cave (Tc 272)

<i>Palo Blanco Phase</i>		
Occupation 31	Zone A	300-500 A.D.
Occupation 29, 30	Zone B	200-400 A.D.
Occupation 28	Zone C	100-300 A.D.
Occupation 26, 27	Zone D	50-250 A.D.
Occupation 24, 25	Zone E	0-200 A.D.
Occupation 22, 23	Zone F	50 B.C.-150 A.D.
<i>Santa Maria Phase</i>		
Occupation 20, 21	Zone G	400-150 B.C.
Occupation 19	Zone H	550-350 B.C.
Occupation 17, 18	Zone I	850-600 B.C.
<i>Ajalpan Phase</i>		
Occupation 16	Zone J	1500-1200 B.C.
<i>Purron Phase</i>		
Occupation 15	Zone K ¹	1700-1500 B.C.
Occupation 13, 14	Zone K	2300-1800 B.C.
<i>Abejas Phase</i>		
Occupation 12	Zone L	2900-2600 B.C.
Occupation 11	Zone M	2700-2200 B.C.
Occupation 10	Zone N ¹	3300-2800 B.C.
Occupation 9	Zone N	3300-2900 B.C.
<i>Coxcatlan and Abejas Phases</i>		
Occupation 8	Zone O	3800-3000 B.C.
<i>Coxcatlan Phase</i>		
Occupation 7	Zone P	3800-3400 B.C.
Occupation 6	Zone Q ¹	4000-3600 B.C.
Occupation 5	Zone Q	4600-4200 B.C.
<i>El Riego Phase</i>		
Occupation 4	Zone R	6300-5400 B.C.
Occupation 3	Zone S	6400-5600 B.C.
Occupation 2	Zone T	6500-5800 B.C.
Occupation 1	Zone U	6600-6000 B.C.

gests that the occupation occurred during the spring. The only evidence we have of the group's subsistence is the grinding stones. Seeds evidently were collected and ground up for food. Evidence of technology is equally scant, but we do know that the tools were made by the grinding technique and the large flake indicates that they know how to chip flint (by percussion). Zone U was possibly occupied by El Riego peoples who used ground-stone tools, unlike the peoples of the previous Ajuereado Phase. Furthermore, Zone U is beneath Zone R, securely classified as El Riego.

The Way of Life of Zone T

Zone T, better defined than Zone U, covers a somewhat larger area (Fig. 28). It is composed mainly of layers of rocks from roof fall and a 20 to 30-cm. thickness of the yellow windblown sand or silt that covered

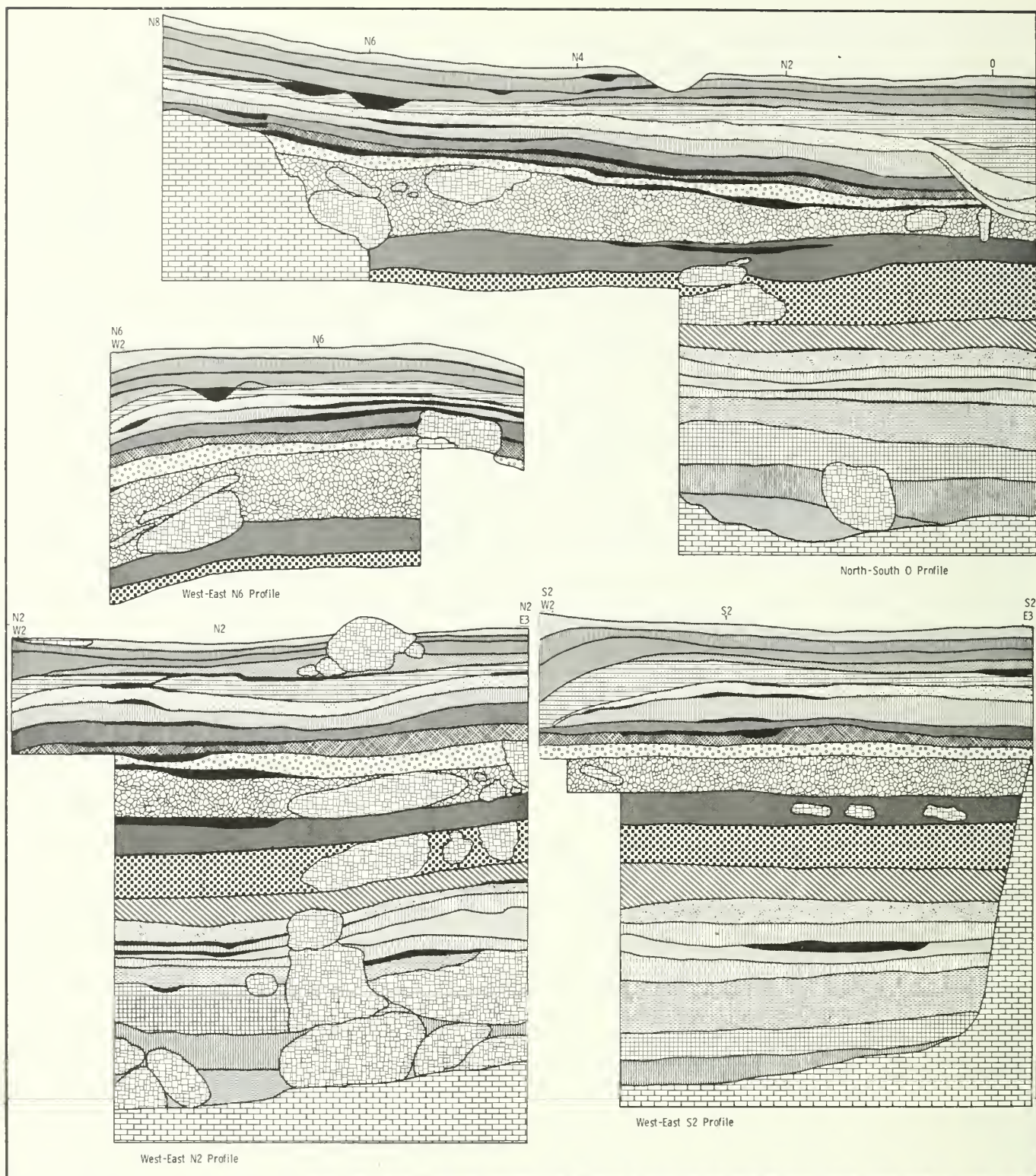
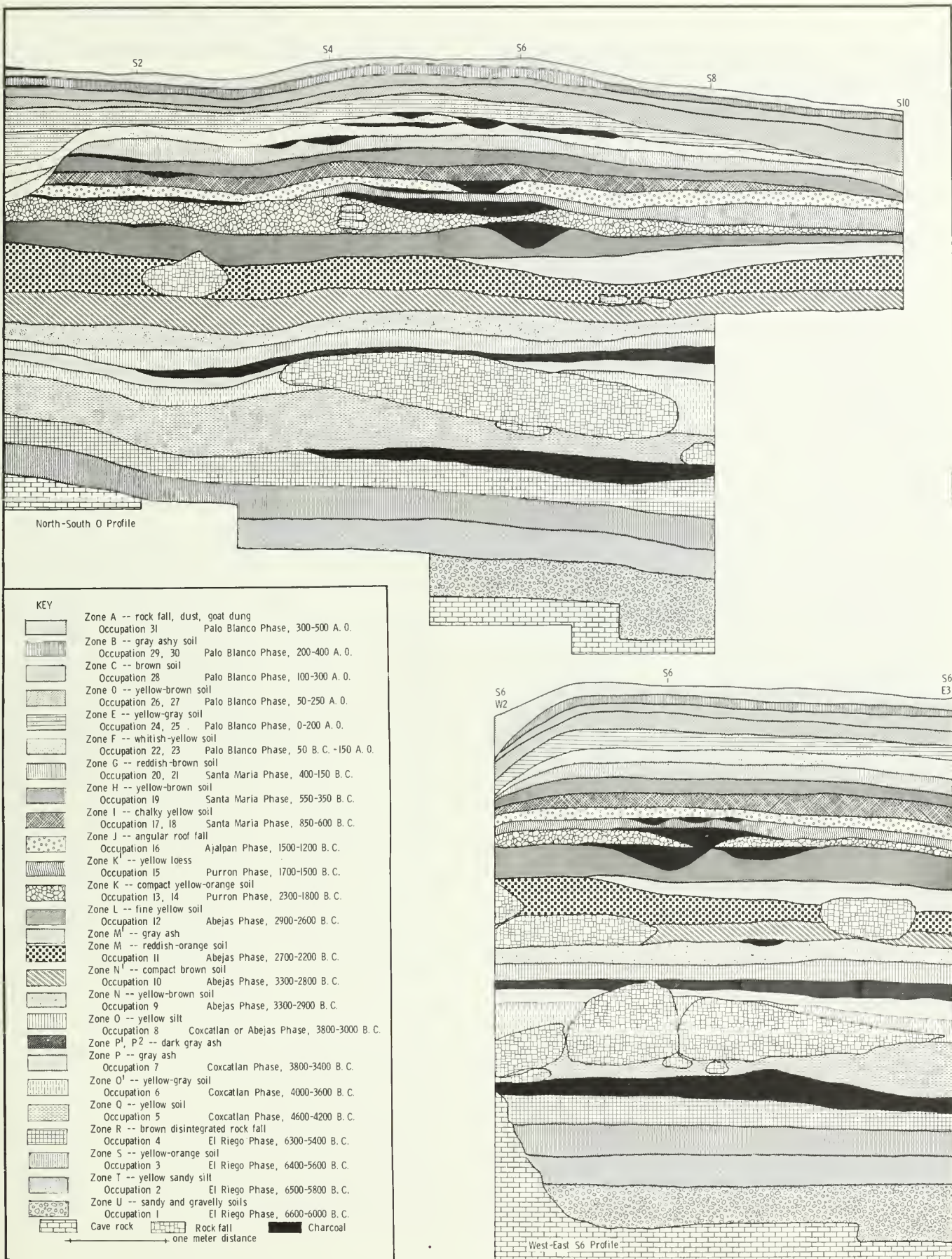


Fig. 26. North-south profile of Purrón Cave along the 0 axis (top and right) and west-east profiles of N6, N2, S2, and S6 (bottom and right).



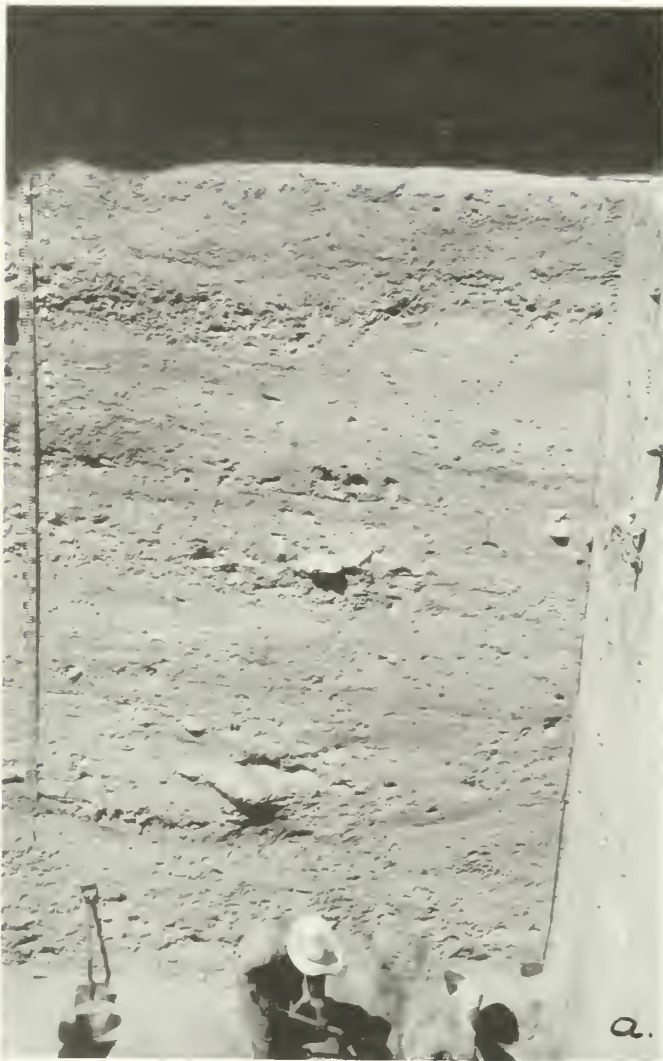


Fig. 27. E3 profile from south 5 to south 8, as viewed from the west.

Zone U. The top of the strata is well defined and bears evidence of human occupation: S3 to S8 and between E3 and W1 or W2, an estimated area of about 18 square meters. The north end of the strata, about 13 square meters, was covered with a fine layer of ash and there were artifacts, 2 chips and 3 cobbles in S4E2. To the south, boulder metate-milling stones occurred in Squares S6 and S5E1. A small sliver of leg bone of a large mammal was found in S6 and a cobble was next to a small charcoal-filled pit, about 60 cm. in diameter and 10 cm. deep, with its center at S7.3E1.

All of this suggests to us a short spring(?) occupation by a small group (a microband). Seeds were collected and ground, and animals were hunted, as suggested by the fragment of mammal bone. The ground

and chipped materials are the only evidence of technological activities.

The evidence that this occupation was possibly a component of the El Riego Phase is about the same as that for Zone U.

The Way of Life of Zone S

This zone was discernible in about 42 1-meter squares from S2 to S8 between W1 or W2 and E3 or E4. This strata, composed of yellow-orange soils formed mainly by roof fall and wind, averaged about 30 cm. in thickness and was covered by a small patch of ash. This patch of ash, only 1 to 3 cm. thick, covered an area of about 14 square meters bounded roughly by Squares S7E3, S7, S2, and S4E3 (Fig. 29). All the artifacts and refuse (except for 7 bones found in S1) were in or on this ash. Thus, the occupation must have been by a very limited number of people (a microband); the single charcoal hearth area (about 50 to 70 cm. in diameter and 10 cm. deep) further indicates a single cooking area for a single small group. The limited number of artifacts in this small area of refuse, as well as the thinness of ash strata, suggest a short (seasonal) occupation. The bone of a rat and the numerous grinding stones for the preparation of kinds of seeds that only occur in Lencho Diego Canyon in the spring and early part of the wet season suggest an occupation roughly from May to July.

We found deer (*Odocoileus virginianus*) bones (femora and vertebra, probably of a single animal) and 7 slivers of bones of a large mammal in S1. Further, the rabbit and rodent jaw bones found may indicate a trapping activity as well as hunting. The mullers and milling stones again suggest a seed-collecting activity as well as preparation of the seeds for food by grinding them into meal. It might be added that 10 of the 12 grinding tools and 6 of the 15 bones come from contiguous squares to the south, suggesting a food preparation area (Activity Area 1). Butchering big game seems to have taken place outside the cave, but they evidently cracked the bones for marrow or marrow stew (with cobbles or choppers) within the cave. The hearth had 4 fire-cracked rocks in it and two of the bones were burned. Roasting was one method of preparing food. However, the high proportion of grinding stones and the limited number of bones, as well as the scraper-plane, suggest a diet mainly vegetal (seeds).

Evidence of technology is limited, except that we do know that a number of milling stones and mullers were ground out from local river boulders. The choppers, scraper-plane, and two of the chips with striking

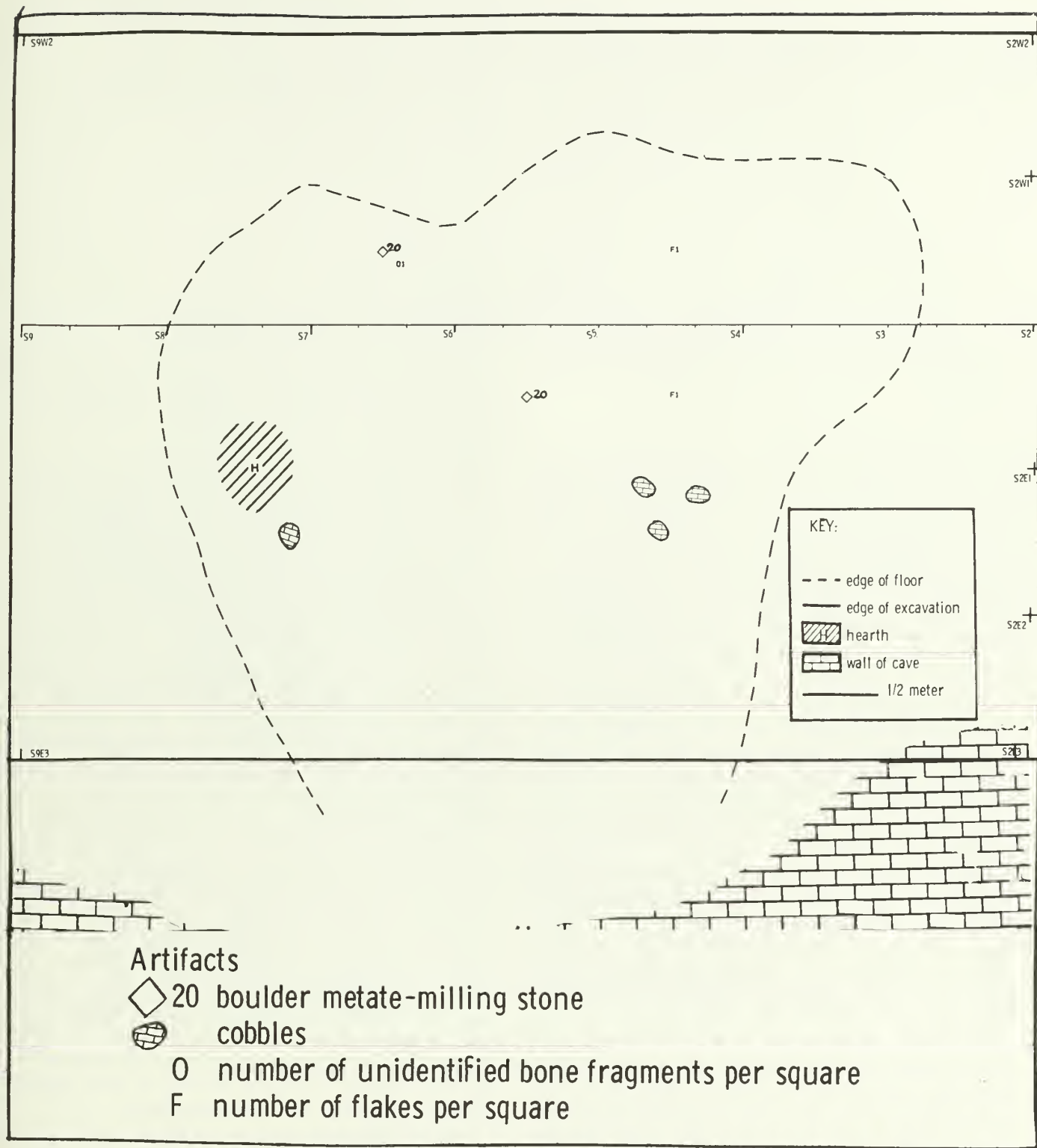


Fig. 28. The activity area of Zone T of Tc 272 with a key to its ecofacts and artifacts.

platforms appear to have been made by percussion—evidence of a chipping industry, if only a limited one. The lack of any cores or even very many flakes (only 13), indicates that the tools must have been manufactured outside the cave. Since a scraper-plane was found on a floor with deer bones, perhaps deer skins were cleaned and scraped, and the flakes may have been used to tailor the skins, indications of a possible leather-working industry (Area 2).

The similarity in the type of scraper-plane, milling and muller stones, and choppers, to those in overlying Zone R, clearly an El Riego component, indicates that Zone S probably is also an El Riego component. On the basis of artifact seriation, our guess is that this occupation (Occupation 3) took place between 6400 and 5600 B.C.

The Way of Life of Zone R

Some time following the occupation of Zone S, a large portion of the roof fell onto the northern end of the cave, forming a steep slope of rock north of the area between the N3 and N4 axes. Some of the talus spread southward and capped much of Zone S, and eventually, with dust or dirt from the rock fall, as well as possible aeolian soils, totally capped the underlying zone to a depth of about 10 to 30 cm. At the time Zone R had built up to this stage it was occupied. This occupation is indicated by a very distinct layer of charcoal extending from about N3 to beyond S8 between W1 or W2 and at least E3 (probably about E4), a total area of between 50 and 60 square meters (Fig. 31). One part of this area (bounded by the stakes at S5W2, S2E3, and S8) about 15 to 20 square meters had a much thicker (20 to 40-cm.) deposit of charcoal on it. Within this area at about S5E2, S6E2, S5E3, S6E3, was a large (1 by 2.5 meters) deep (about 40-cm.) pit, filled with hundreds (we counted over 131 of them) of fragments of fire-cracked rocks. Superficially, then, it would appear that we had a much larger group living on this floor than had occupied Zone S, but we don't think so. We believe that the occupation was still by a microband of one or two families, but a microband that occupied the cave for a much longer period of time. The many seed-grinding tools may indicate that they came to the cave in late spring (May) when the seeds blossomed; the burned iguana bones would show their stay lasted through the summer wet season; the cosahuico and chupandilla fruits may be interpreted to mean that occupation lasted at least into the early fall (October) when these fruits ripen. The single hearth, at best a large one, and the concentration of artifacts and most of the refuse

in the thick charcoal area, suggest a relatively small group.

Many of the artifacts and objects found in the occupation layer of Zone R were concerned with the subsistence of the occupants. The bones of at least 2 deer and the Trinidad point suggest hunting. Trinidad points are often on atlatl dart (foreshafts), and the point is of such a size and the barbs sufficiently large to indicate that the dart was hurled rather than used in a jabbing motion, a dart-stalking type of hunting. Once the dart was in the animal it would kill him rather than bleed him. The rabbit and iguana bones, particularly the snapped rabbit tibia, suggest a trapping subsistence activity. Other subsistence activities were mainly concerned with plant collecting, that is, fruit picking (chupandilla and cosahuico), leaf cutting (*Agave* leaves), and seed collecting (mullers and milling stones).

Subsistence includes food preparation and we have some evidence of grinding, cooking, and butchering activities. Some butchering of deer occurred in the cave, while the roasting pit and the fact that most of the bones were charred suggest that meat was roasted on the hot stones of the large hearth. Ten fine slivers of unidentified bones and the shattered nature of 9 of the deer bones suggest that marrow was sought; perhaps the 3 cobble hammerstones and the chopper were the utensils used to crack the bones. In the large pit some of the charcoal was of a very laminated nature. This suggests that *Agave* leaves were roasted, as well as meat. The two scraper-planes may have been used to gouge vegetal delicacies from *Agave* leaves or other plants. Grinding seeds must have been the major food preparation activity. An incredibly high proportion (76 out of 84) of the tools were for grinding. The concentration of many of these tools in the south end near the roasting pit tells us not only where they ground their seed but also suggests parching or roasting the seeds or the meal from these seeds. Grave goods with Burial 4 included a milling stone and animal bones, along with an obsidian chip and a side-scraper. These artifacts associated with the aged female burial suggest that she ground seeds and cut meats. Perhaps females prepared and collected the food while the men hunted, a common division of labor among primitive peoples at this subsistence level.

With so little preservation, it is difficult to determine exactly what their diet was. Certainly the rabbit, iguana, and deer bones suggest meat; and the cosahuico, chupandilla, *Agave* leaves, and milling stones suggest plant foods. They consumed more of the latter if, the large number of seed grinders, the wear on the

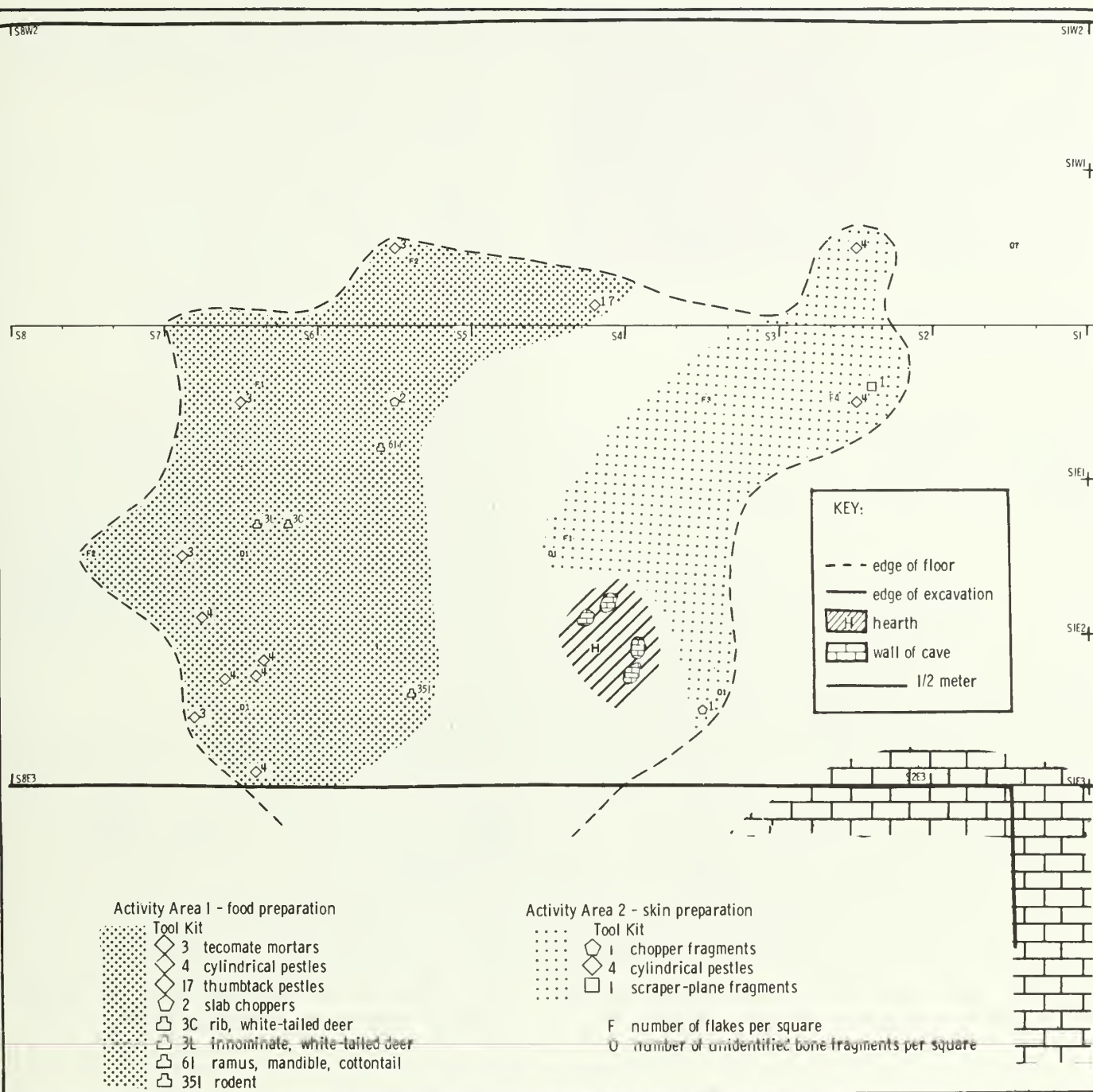


Fig. 29. The activity areas of Zone S of Tc 272 with a key to their ecofacts and artifacts.



Fig. 30. Burial No. 4 of Tc 272 in Squares E4 and S1E4 of Zone R, as seen from the west.

teeth of Burial 4, and the small number of bones is any indication, and we believe it is.

One technological activity during this six-month stay must have involved the grinding of pebbles and boulders into mullers and milling stones. We certainly found many of these tools and abundant raw material in the roasting pit. The flint tools, as well as 3 of the chips, tell us a little of their knapping activities. All the tools (except the side-scraper) were made by percussion blows on nodules. The side-scraper is evidence of use of the pressure technique in making a cutting edge and that flakes were sometimes derived from cores with a prepared striking platform. The lack of chips or cores (unless they cleaned the floors after chipping) seems to indicate that their flint knapping was not done in the cave or at least not during their sojourn there.

The deer bones, side-scraper, end-scrapers and scraper-plane all point to skin-working in a possible northern Activity Area 3. The projectile point was certainly attached to a wooden shaft. We know they had some knowledge of the techniques of woodworking, but we can't determine exactly what they were. At any rate, we don't have the evidence, but many other technological activities might have taken place during the occupation on Zone R in Purron Cave.

Burial No. 4 (Fig. 30, see also Vol. 1 of this series, pp. 93-94) gives us a glimpse of another aspect of their culture and activities (Activity Area 2) in the fall. The tools and foods, with the aged female, hint at a belief in an afterlife. Further, the tool kit of the dead seems to have been closely connected with their activities during life. This burial (as well as contemporary ones in Coxcatlan Cave) suggest a standardized belief system for the El Riego peoples. It would appear that it was "right" for the dead to be interred in pits, in an extended position on their backs,

sprinkled with red ochre, and accompanied by tools and some food. This well-defined set of practices hints at some sort of burial ceremony or rites, perhaps directed by a shaman (as so often happens with groups of this economic level.)

The Trinidad point and the type of scraper-plane and milling stones indicate that Occupation 4 must be considered an El Riego component. The seriation of the Zone R artifacts (Vol. 3 of this series, Table 1) and their similarity to those of the C-14-dated Zone XVI of Tc 50 (Vol. 3, Table 2) and Zones F and G of Tc 307 (Vol. 3, Table 3) suggest that Zone R of Tc 272 occurred between 6300 and 5400 B.C.

The Way of Life of Zone Q

After the occupation of Zone R, yellow soil blew into the cave covering the rocks in the north end of the cave as well as the southeast part, building up a layer from 30 to 50 cm. thick; a small occupation then laid down a thin ash layer, capping the floor of Zone Q (Fig. 32). The total area of the occupation covered about 44 square meters, but only about 20 square meters had ash or artifacts on them. The occupation on Zone Q must have been brief and by a small group for we didn't even find a hearth area. The lizard bone suggests the short occupation was during the wet season.

During this brief summer stay they killed a single deer, butchered it elsewhere and brought a few of the bones with adhering meat to the cave to roast on some fire nearby. They also collected some *Agave* leaves, perhaps scraping them with the two scraper-planes, and ground up some seeds in the metate-milling stones with the muller or manos. There is little evidence for other aspects of their subsistence.

Evidence of their technology is also very limited. Perhaps they made the muller, manos, and 3 metate-milling stones by grinding local river pebbles into form, during their brief stay in the cave. The 3 chipped tools tell us little about their flint-knapping activities other than that they used the percussion and pressure technique and chipped these tools outside the cave. The two scrapers also could have been used to scrape the hide off the deer eaten during the occupation of Zone Q.

Classification of the zone on the basis of its limited number of artifacts is difficult. In Volume 2 we classified it as possibly a late El Riego component, while in Volume 4 we classified it as a possible early Coxcatlan component. The Carbon-14 date of 4400 B.C. \pm 230 (I-761) seems to confirm the later classification (*Radiocarbon* 11: 94).

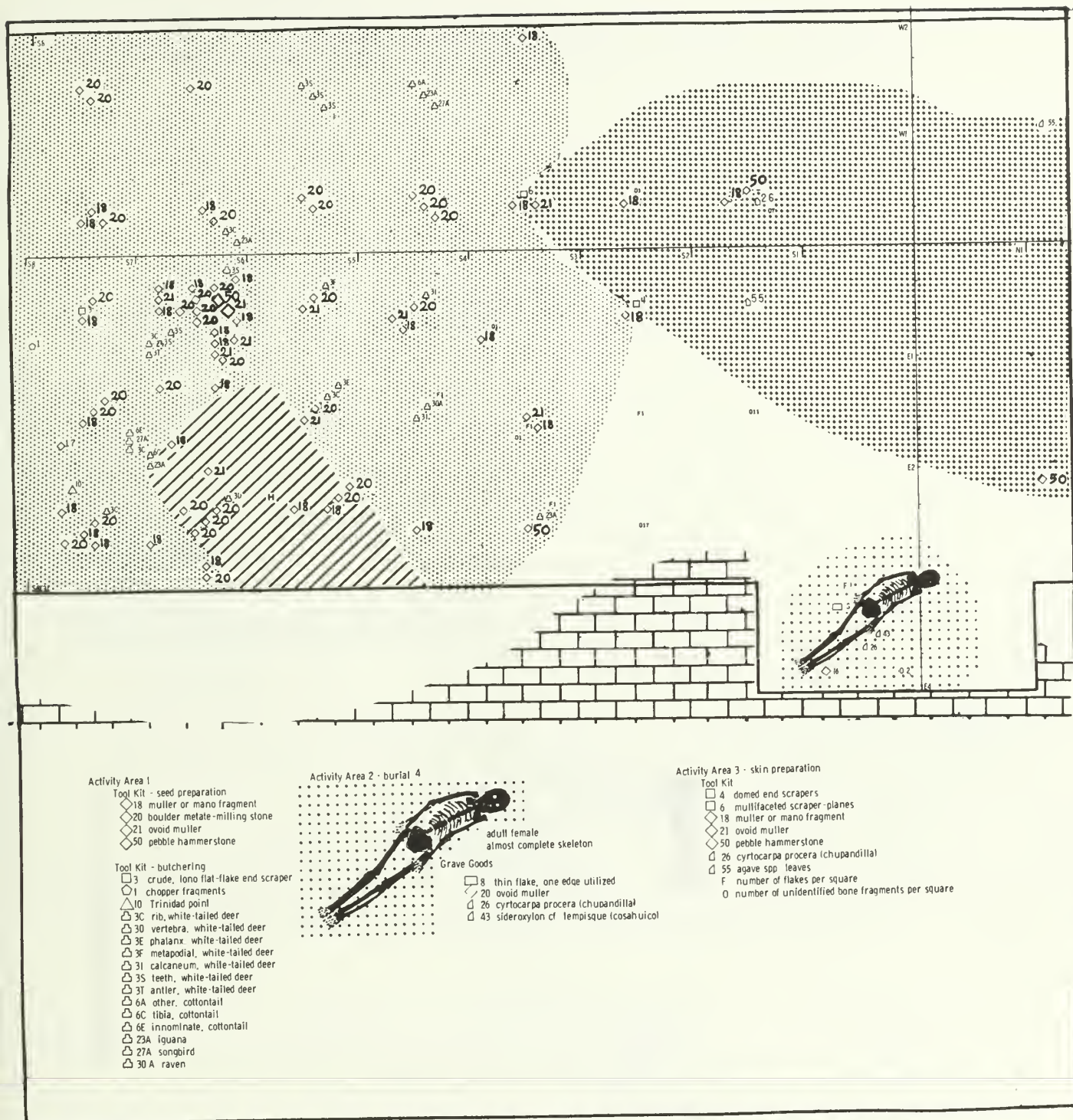


Fig. 31. The activity areas of Zone R of Tc 272 with a key to their ecofacts and artifacts.

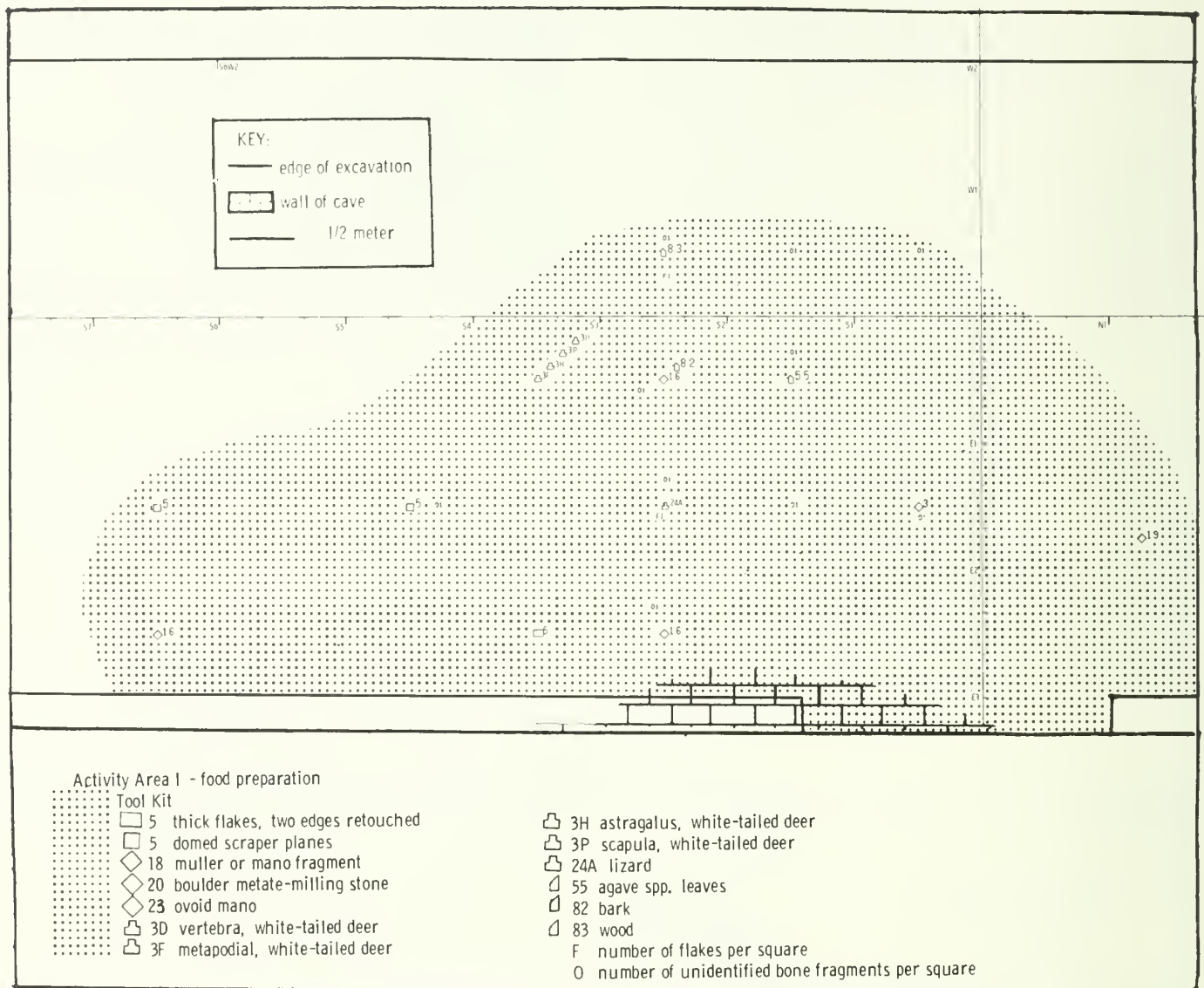


Fig. 32. The activity area of Zone Q of Tc 272 with a key to its ecofacts and artifacts.

The Way of Life of Zone Q¹

Formed over the top of Zone Q, and often blending into it, was a 10-cm.-thick stratum of yellow-gray soil, Zone Q¹. Patches of ash and a well-defined floor covered only about 45 square meters (Fig. 33). There were no artifacts, 1 flint chip, 1 *Agave* leaf, 2 pieces of wood, 13 small slivers of bone (mostly burned), and one small shallow charcoal-filled pit in Squares S3E3 and S3E2. Certainly this evidence would indicate a short occupation by a small group, but it gives little information about their activities. Perhaps then it is

the Burials 2 (Fig. 34; see also Vol. 1 of this series, pp. 96-97), 5, and 6 that were the real purpose and activity of the Q¹ occupation. Is it not possible that the few ecofacts, refuse, and charcoal of the fireplace were deposited during the period when Burials 2, 5, and 6 were being interred and perhaps are connected with living and rites during that brief time?

Burial 2 occurred in a pit, about .75 cm. north-south, 50 cm. east-west, and about 40 cm. deep, in Square S1E4. It appears to be a flexed burial on its right side with its head to the north. The lack of the left radius and ulna as well as the right foot, tibia, fibula, femur,

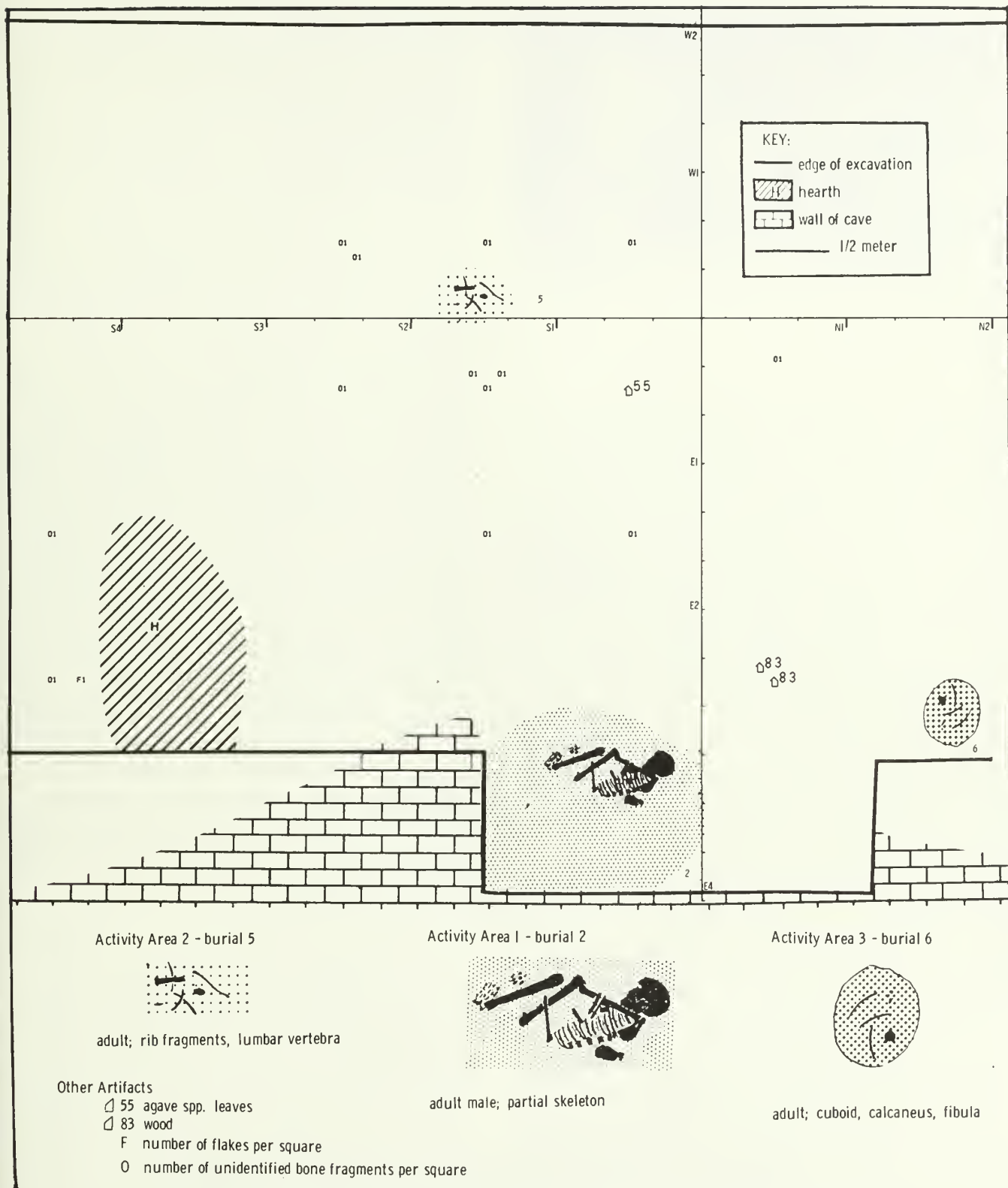


Fig. 33. The activity areas of Zone Q¹ of Tc 272 with a key to their ecofacts and artifacts.



Fig. 34. Burial No. 2 of Tc 272 in Square S1E4 of Zone Q¹, as seen from the west.

right pelvis sacrum, and the right arm of this adult male, however, seems to indicate that it was a secondary burial which was perhaps not totally decomposed and which was reinterred in Purron Cave during Zone Q¹ times. Another Burial, No. 6, from this floor was in a very shallow (20 cm. deep), small (40 cm. in diameter) pit in the northeast quadrant of Square N2E3. It consisted of only 2 or 3 rib fragments and a lumbar vertebrae. Besides these human remains the charred 5 fragments, a fibula, a cuboid, a radius, and ribs of still another individual lay on the floor of S1. This we have called Burial 5. One cannot help but wonder whether Burials 5 and 6 were not some sort of human sacrifice, cremation, and cannibalism made in conjunction with the rites for the male Burial 2, or whether they were merely burned bones of other dead brought in for the rites of Burial 2. Regardless of what they were, we believe Zone Q¹ represents a brief stay in the cave by the small group of participants involved in burial rites and ceremonies.

The only hint we have of the cultural affinities of the occupation is from its stratigraphic position and the radiocarbon determination of 3897 B.C. \pm 197 (I-754 and I-768) which place it in the time period of the Coxcatlan Phase (*Radiocarbon* 11: 94, 95).

The Way of Life of Zone P

After the brief ceremonial occupation on Zone Q¹, gray sand and soil covered to a depth of about 10 to 30 cm. the south end of the cave from N3 to at least S8. At this time the cave was again occupied and a layer of ash and charcoal laid down over an area of about 50 square meters. This composed Zone P (Fig. 35). It might be added that following this occupation two small zones, about 10 cm. thick, of gray ash, capped by burned layers, were deposited on Zone P

and called Zones P¹ and P². However, only Zone P had artifacts, so we shall discuss only it. The floor covers about 50 square meters and perhaps extends east and south of the area excavated. There are at least three patches of charcoal and one of burned rocks on the floor, suggesting hearths. This would suggest either a macroband (4 families) or a series of small occupations by a microband during (roughly) the same season. Flannery has suggested that, on the basis of the deer bones and the absence of wet-season animal bones, this occupation (or occupations) took place during the dry season (Vol. 1 of this series, Chap. 8). However, the presence of manos and mullers that could be used to grind spring seeds would tend to modify his seasonal evaluation.

The occurrence of bones of 2 deer and 1 rabbit, roughly between S5E3 and S3, suggests that this (or these) may have been a hunting camp (or camps). Butchering may have been done elsewhere but some of the meat was taken to the cave for cooking (most of the bones were charred); some of the bones were cracked for marrow, probably by the two choppers. Perhaps these animals were also skinned with the domed end-scraper found in S2E2. These tools also could have been used for pulping plants; the two mullers could have been used to grind seeds. The hypothesis is, however, perhaps negated by the complete lack of milling stones and metates and we would then speculate that perhaps they were used to grind up bone or marrow for some sort of stew. The hearth at S3.5E1.5, between the ovoid muller and spherical mano, was full of fine flakes of ground-up bone.

Evidence of other activities is totally lacking; so is evidence of the cultural assignment of the zone. Since Zone P is above Zone Q¹, dated about 3800 B.C., and below Zone L, dated at 2750 B.C., it would seem likely it is late Coxcatlan.

The Way of Life of Zone O

Zone O, above the floors of Zone P, is composed of yellow aeolian soils from 10 to 20 cm. thick. It extends from the pile of roof fall at about the N3 axis to the S8 axis and probably 1 meter or 2 beyond this line. It varies between 3 to 4 meters wide (from W1 or W2 to E3) and covers an area of about 35 to 40 square meters. It has a tendency to have a thin capping of ash or fired red surface on the area from about the 0 axis to S6, between W2 and E3, which faded to an ill-defined surface outside this area. There is also an area a half-meter in diameter between 0 and S1 that is heavily burned and might be interpreted as a hearth area (see Fig. 36). Artifacts (2), shells (3), bone

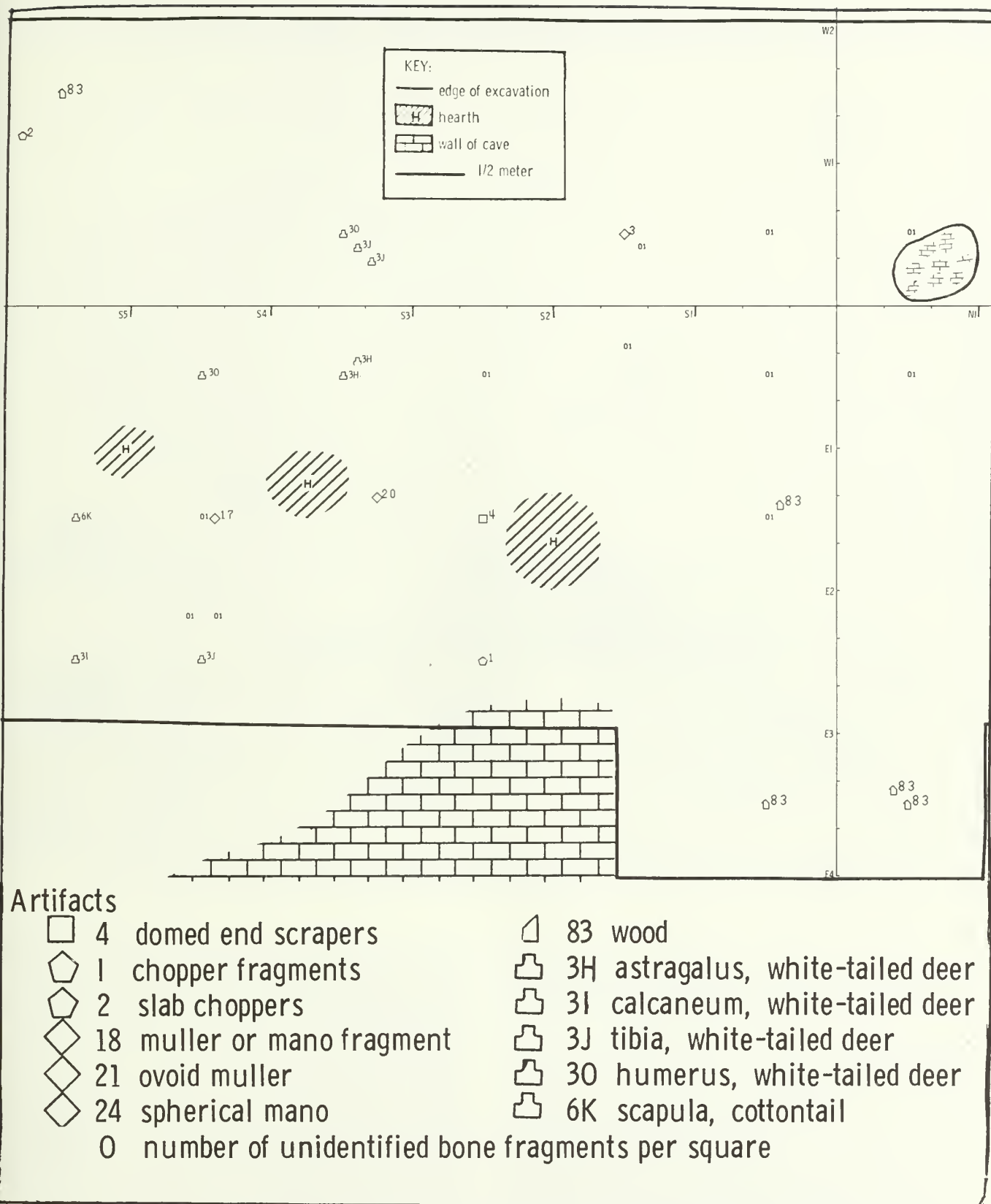


Fig. 35. The activity area of Zone P of Tc 272 with a key to its ecofacts, artifacts, and hearths.

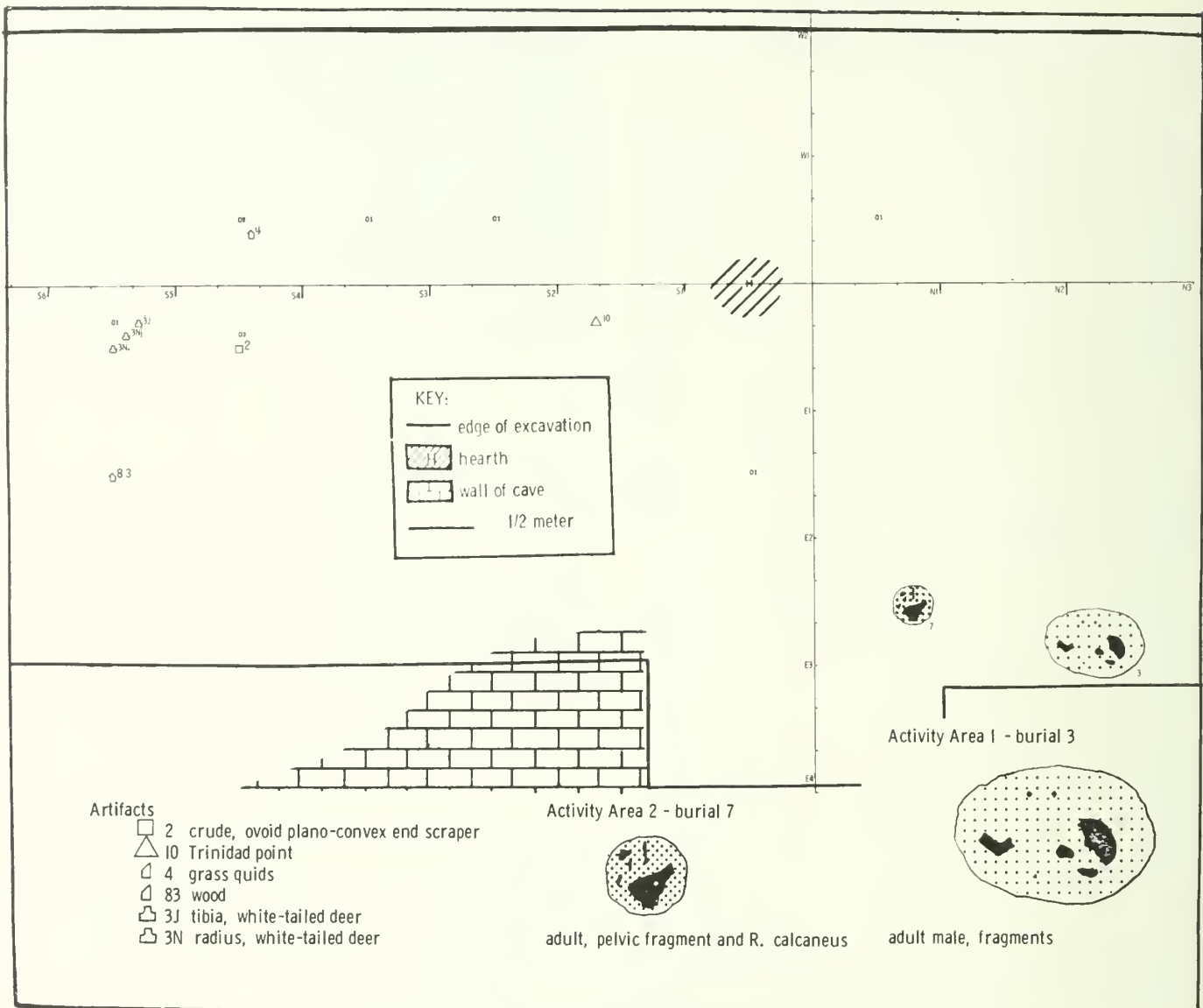


Fig. 36. The activity areas of Zone O of Tc 272 with a key to their burials, artifacts, ecofacts, and hearth.

fragments (3), and plant remains (2) are sparse. Occupation certainly was of short duration, perhaps, as Flannery suspects, during the dry season and by a small group (Vol. 1 of this series, Chap. 8).

We have concluded that the main function of this occupation was connected with the Burials (3 and 7) and the accompanying burial ceremonies. The 3 burned deer bones from a single deer and the 10 burned scraps of bone, perhaps from the same deer, the shells, and the grass quid may represent a meal or two, eaten during the period of the burial ceremonies or perhaps even as part of the ceremonies. The meat may have

been roasted over the hearth in the area between the 0 and S1 stake. The end-scraper may have been used in butchering and skinning the deer, while the fragment of a Trinidad point may have been the atlatl dart point that killed this animal.

Burial 3 (see Vol. 1 of this series, p. 97) was in a shallow 20-cm.-deep pit from N1.8 to N2.6 and from E2.6 to E3. This was a secondary burial consisting of a few chopped-up fragments of long bones and ribs of an adult that had been burned. Burial 7, consisting of a charred iliac fragment and a right calcaneus, probably of another adult, occurred on the floor of Square

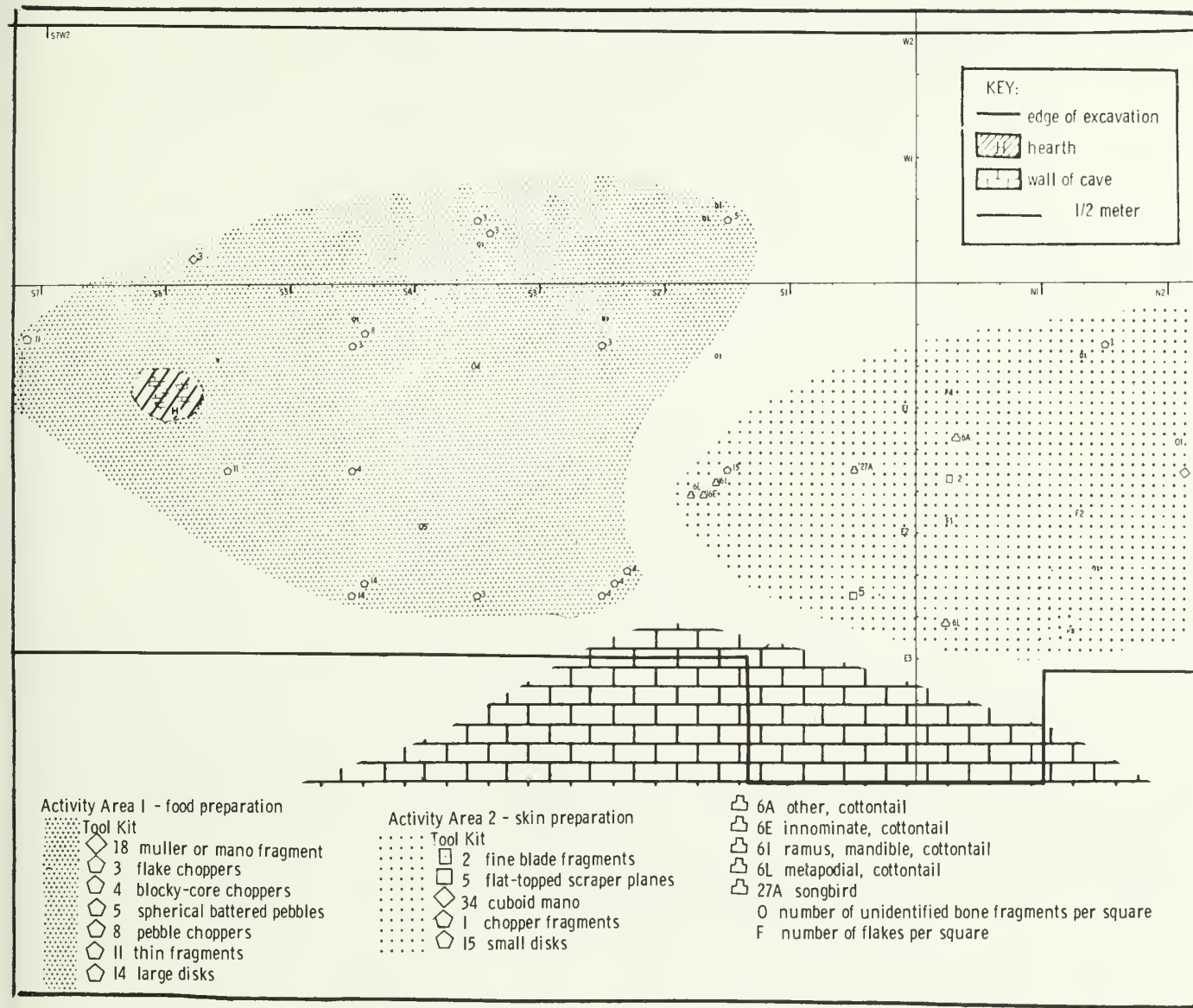


Fig. 37. The activity areas of Zone N of Tc 272, with a key to their ecofacts and artifacts.

N1E3. The burning of the bones, as well as their being chopped and bundled up in order to bring them into the cave, hints at some form of burial rites under some sort of direction of a leader of the ceremony (a shaman). The similarity of the practice of cremation and bundling of these burials to that of the El Riego burial in Layer 5 of Tr 35w, the El Riego burials in Coxcatlan Cave, and the Coxcatlan burials in Purrón Cave, Zone Q¹, suggest an early well-established tradition of burial practices and beliefs for the Tehuacan region.

Classifying this component is most difficult; however,

its stratigraphic position suggests it is of late Coxcatlan or early Abejas times, roughly from 3800 to 3000 B.C.

The Way of Life of Zone N

Zone N is composed of some rock fall and a compact yellow-brown soil, probably deposited by wind action. This zone varies in thickness from 10 to 30 cm. The zone is discernible from about S10 to almost N4 between the W1 and E3 axis, an area about 50 square meters. From about S7.5 between W1 and E3 to about S1 to S1E2 a thin layer of ash capped this zone, an area of 16 square meters (Fig. 37), and the ma-

jority of artifacts, shells, and bones occurred on or in this ash. There was one area about 50 cm. in diameter and 10 cm. deep with its center at S6.25E1 that was filled with ash, fire-cracked rocks (at least 5), and a large amount of finely splintered, burned bones. This seems to be the only hearth on this floor. When one considers the limited number of artifacts and the small area of the bones, shells, and artifacts, the thin layer of ash, and this single hearth, one must conclude that the occupation was by a microband during a very brief period. Exactly what season of the year this brief occupation took place is difficult to discern. Flannery has suggested, mainly on the basis of the lack of wet-season animal bones, that this occupation occurred during the dry season (Vol. 1 of this series, Chap. 8). The complete lack of metates or milling stones that would be used on either seeds or domesticated plants (mainly corn) that occur in the spring or wet season would tend to confirm this opinion.

One of the main concerns of the peoples of Zone N seems to have been subsistence. The few (6) unidentified burned fragments of large mammal bone suggest some hunting and to quote Flannery (Vol. 1, page 165), the animals "may have been butchered at the site of the kill and selected parts brought to the cave from some distance away." The cottontail and bird bones also suggest some trapping. Most of the tools we uncovered indicate that the main activity that actually took place on the floor in the south end in Activity Area 1 was food preparation. The 11 choppers could have been used to cut meat while the spherical battered pebble, the 2 large bifacial disks, and maybe the pestle and muller, may have been used to chop up the meat as well as to splinter the bone we uncovered (for marrow). The shells, of course, suggest some collecting, while the scraper-plane, pestle, and muller could have been used to render some collected vegetal foods more edible. These foods were probably roasted on river boulders placed on the fire or on hot coals in the hearth area.

Bones and other artifacts hint at one other activity in the north end of the stratum (Activity Area 2), the working of hides. The fine blade, flakes, chipped disk, and flat-topped scraper-planes would have been the tools of the trade. It might be added that all the tools could also be used for woodworking.

The bifacial disks, cuboid pestle, and fine blade all point to Zone N as a probable Abejas component. The seriation of its limited artifact assemblage suggests the occupation (Occupation 9) took place in the general time period from about 3300 to 2900 B.C.

The Way of Life of Zone N¹

Zone N¹ was a thin layer 10 to 20 cm. thick of hard compact yellow-brown loess which blended in part into Zone N and covered the ash layer on top of that zone. It ran from about North 2 to South 8 and only in the area from S4E1 to S8E1 was it capped by burning or a fine layer of ash. No fireplaces occurred, and only one fine blade fragment was uncovered, along with 2 chips, 15 shells, 2 fragments of bone, 1 *Agave* leaf, 5 pieces of bark, and 8 pieces of wood. It certainly looks like a brief occupation by a few people, but exactly what their activities were is difficult to discover. Perhaps the burned human bones (Burial 8) in Square N1E3 give us a hint as to what they were. Is it not possible that this layer, Zone N¹ in Purron Cave, represents the activities (in part ritual and ceremonial) that took place when Burial 8 was burned (?) and then buried in the cave? Zone N¹ was probably occupied during Abejas times, 3300–2800 B.C.

The Way of Life of Zone M and Zone M¹

After the burial ceremony on Zone N¹ was completed there was another large rock-fall in the north end that spread down over the south end of the cave. The rocks, plus the detritus of the roof rocks, formed a reddish soil and this, and some aeolian soils, finally covered Zone N¹ to a depth of about 40 cm. to form Zone M. At this time another brief occupation, similar to those of N¹ and Q¹, took place in the cave. That is, the cave was used for the burial sites of two adult burials (and cremation) (Burials 9 and 10) in Squares N2E2 and N2E3, respectively. While this took place, 2 chips, 8 shells, and a few burned fragments of bone were left on this floor. This occupation occurred during Abejas times, 2700–2200 B.C. After this period more reddish soil spread over Zone M in the south part of our excavation to form a stratum about 10 cm. thick which in turn was capped by a 3-square-meter patch of ash. It was termed Zone M¹. No human remains occurred in or on it.

The Way of Life of Zone L

Winds next deposited a fine compact yellow soil over most of the floor of Purron Cave, from S10 to at least N6 between at least E3 to W1 or W2. This stratum was about 30 cm. thick, and, except for a small portion in the northeastern part of the cave, was capped by ash and/or charcoal and/or burned red soil. This stratum and its capping is called Zone L (Fig. 38). The portion capped by ash, charcoal, and burned soil

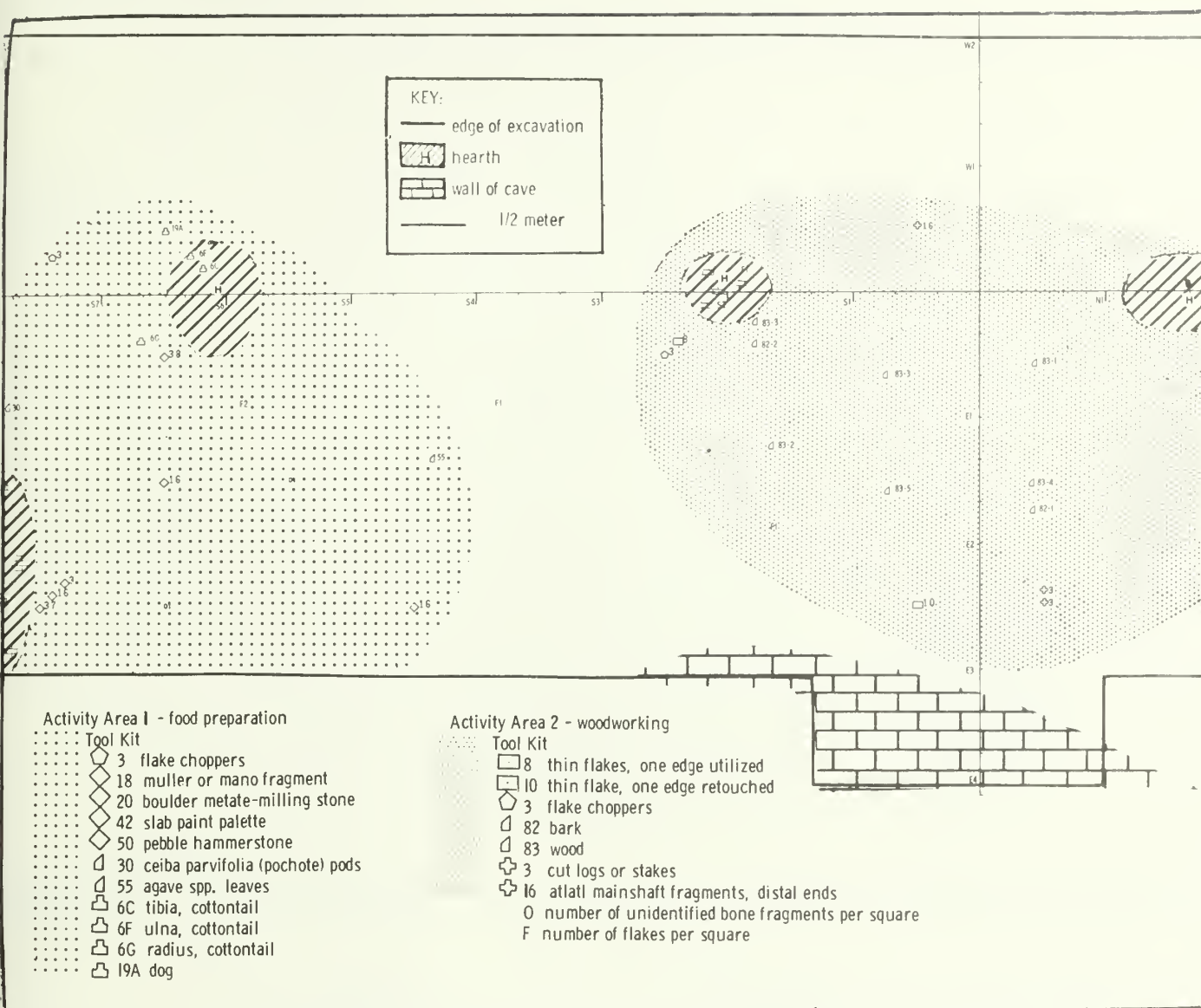


Fig. 38. The activity areas of Zone L of Tc 272 with a key to their ecofacts and artifacts.

covered an area of about 55 square meters. There were two widely-separated charcoal concentration areas in Squares N2 and S6, about 1 meter in diameter and about 10 cm. thick, which we believe were hearths. There were also two areas with heavy concentrations of charcoal and burned rock on the floor in Squares S8E3 and S2 that may also have been cooking areas. Artifacts and refuse are distributed over the whole floor area with only two, not very large, concentrations. It is difficult to tell whether this is an occupation by four different groups (a macroband) at the one time or one group (a microband) at two different times or

a combination of both. The distribution of a pochote pod and milling stones (for grinding spring seeds) on the south area (Area 1) and a digging stick (for spring planting) in the north area (Area 2) suggest a single occupation by a fairly large group. Be that as it may, the limited number of artifacts and thin ash layers seem to indicate that the occupation (or occupations) was (or were) of very short duration. The only reliable evidence of the seasonality of the occupation was a few pochote fibers that fruit in the spring, which we uncovered in S10E2, while planting some artifacts to give our cinemagraphic effort a touch of Hollywood

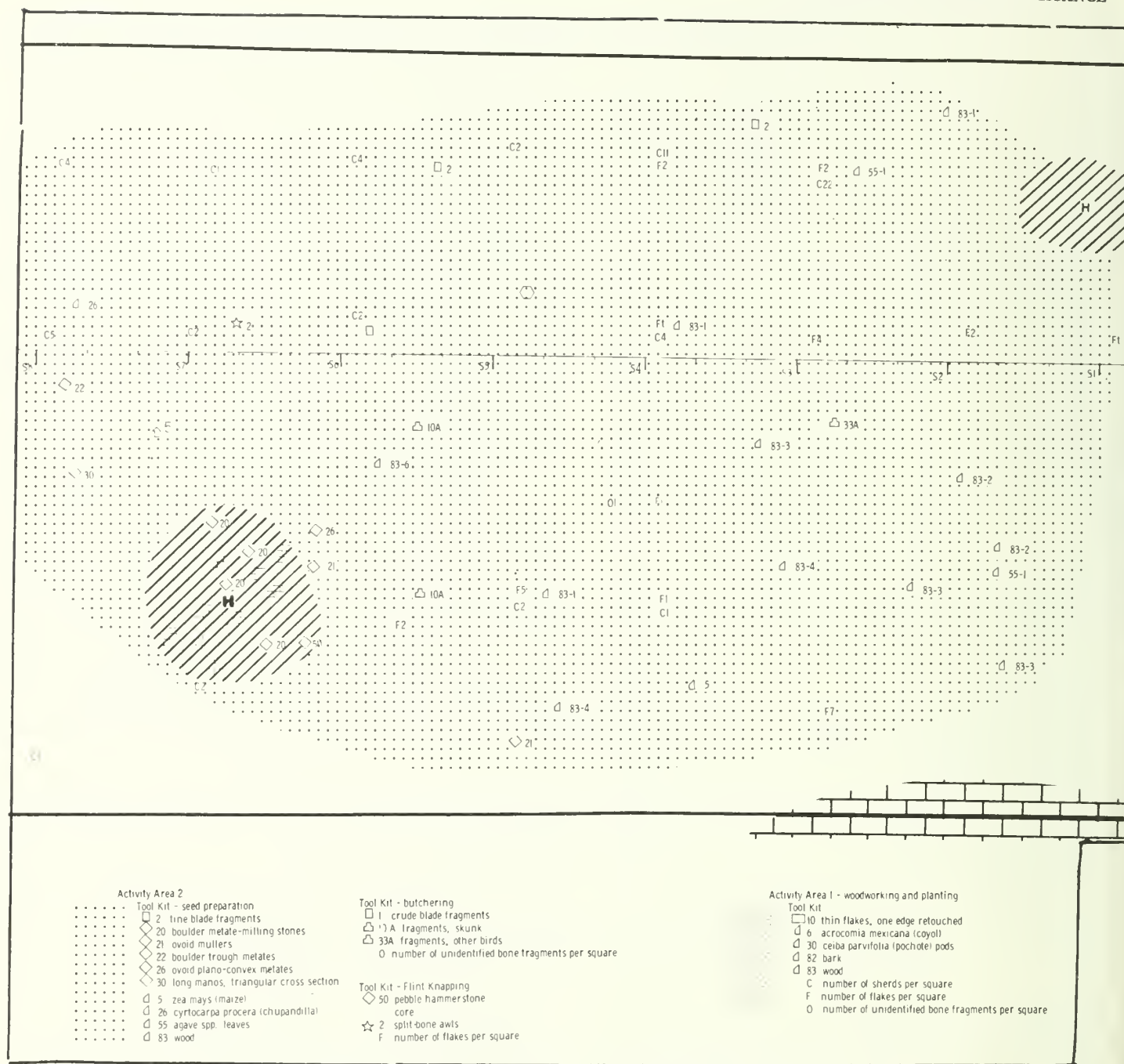
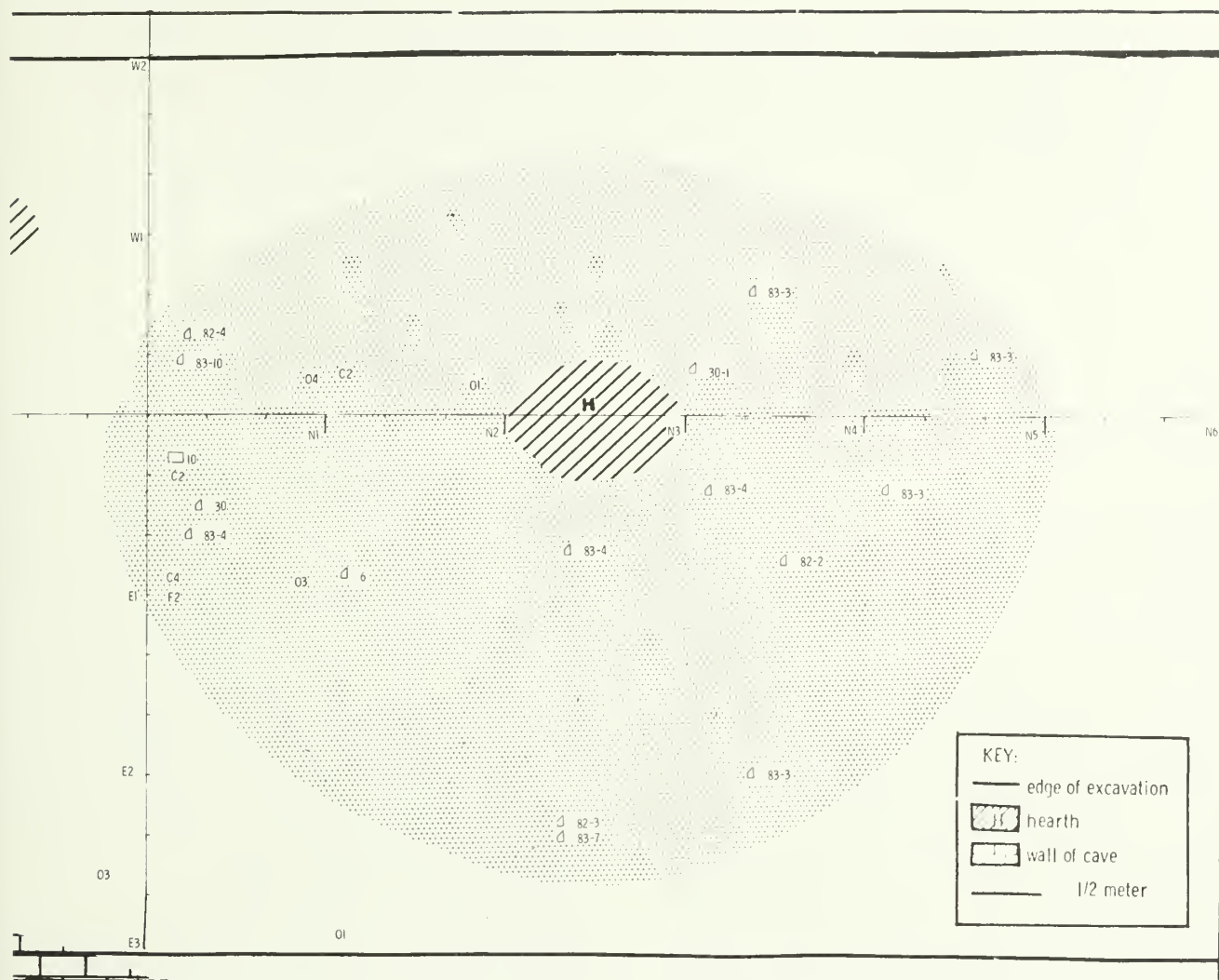


Fig. 39. The activity areas of Zone K of Tc 272 with a key to their ecofacts and artifacts.

realism. This estimate of a spring occupation concurs with our finding a mano-muller and metate-grinding stones, which could have been used for grinding seeds that become available in the spring, as well as with our interpretation that three of the small poles with burned ends were digging tools that would have been used in spring planting. Thus our conclusion, albeit

based on woefully inadequate data, is that Zone L represents a short spring occupation by a macroband.

There are some hints as to the activities of this group during their brief sojourn in the cave. The atlatl fragment, as well as two charred fragments of large mammal bones, indicate that they did some hunting. The rabbit bones may indicate trapping. The



(Fig. 39 continued)

grinding stones evidence seed collecting and the *Agave* leaf, leaf cutting. The wood fragments in the north, Activity Area 2, hint at still another activity, for 12 out of the 18 fragments were small sticks between 1 and 2 inches in diameter; 7 of them had had their bark stripped and 3 had one of their ends burned. We believe that some of these were used as digging sticks and if this is true, then they may have been planting seeds, that is, agriculture or horticulture. The dog tooth, of course, indicates that they kept domesticated animals. The side-scrappers, choppers, muller-manos, and metate-milling stones may have been used in food preparation activities. The southern hearth is an indication that they roasted at least some of their food on hot rocks in Activity Area 1.

The side-scrappers may also indicate that they skin-

ned some animals and prepared hides, but these tools, as well as the chopper in association with wooden tools and wood fragments in Area 2, could have been used in woodworking activities. Certainly the side-scrappers could have been used to strip the bark off the "digging sticks" as well as to cut or saw the stick that was later used as an atlatl dart mainshaft. It might be added that one utilized side-scraper shows scars resulting from sawing. Two large logs show evidence of being chopped down in the "beaver technique," chopping round-and-round in a downward motion. The chopper could have been the tool so used.

The distal end of the atlatl dart mainshaft had impressions of wrappings of string for reinforcement. Thus, our Zone L inhabitants may have been making string from *Agave* since we found a cut *Agave* leaf on

this floor. We may also surmise that paint was prepared during their stay. We found a rubbed stone and a paint pallet with traces of red hematite on it, along with 2 nodules of hematite.

The artifacts, such as the rubbed pebble and the paint pallet, do indicate that Zone L was a possible Abejas component, as does the Carbon-14 date of 2750 B.C. \pm 136 (I-755 and I-572) (*Radiocarbon* 11: 93, 94).

The Way of Life of Zone K

Zone K, which overlays Zone L, was a 30 to 40-cm.-thick stratum of fine compact silty yellow soil discernible from one end of our excavation to the other (i.e., from N8 to S10 between E3 and W2). Capping part of it was a thin charcoal and ash floor. This ash floor was of irregular shape, two main concentrations connected by a narrow 1-meter-wide bridge in Square E1. The north area, Activity Area 1, covered roughly 15 square meters (Fig. 39). In the southeast corner of N3 there was a hearth area about 20 cm. deep. The south area, Activity Area 2, had two hearths in it, one about a half-meter in diameter and 40 cm. deep with its center at S1W1 and the other over a meter in diameter and 30 cm. deep covering most of Square S6E2 and a small adjacent part of S7E2. This southern area covered about 35 square meters. The two areas of heavy occupation and three hearths could represent either a single occupation by a macroband or two brief occupations by two microbands not long separated in time. There is some evidence from the vegetal materials that it is the latter. Found in the north patch, Activity Area 1, were 2 pochote pods and a coyol pit, both spring and winter plants, as well as 4 sticks (out of the 41) with burned tips that could have been used in spring planting of corn. This contrasts with the plant remains found in the south patch which included two corn cobs and a chupandilla pit, which become edible in the late summer and fall. Thus there is some evidence to suggest that Activity Area 1 was occupied by a microband in the spring and Activity Area 2 was occupied by a slightly larger microband in the late summer and fall.

Now let us consider the subsistence activities of these two seasonal microband occupations. The microband occupation in Activity Area 1 of the spring seems to have been for planting. The 8 burned unidentified large mammal bones suggest that while they were involved in this activity they killed, by hunting, some mammals and brought some choice parts of meat back to the cave, cut them up with flint chips and a side-scraper, and roasted them over the hearth in N3. They

also collected and ate 8 snails, a coyol fruit, and 2 pochote pods. Water or food may have been stored in a tecomate of Purron Coarse (8 body sherds found in this area).

Other activities in this area at that time are difficult to discern. However, the presence of 41 sticks, 31 without bark on them, and 9 pieces of bark and a side-scraper with two concave nicks (from whittling or cutting wood) suggests woodworking (making digging sticks?) during their brief stay.

The fall occupation in the south end of the cave (perhaps of the same group who came back to harvest what they planted) has more evidence concerning activities. The 7 burned mammal bone fragments suggest they did some hunting, while the 2 skunk bones and bird bone indicate either hunting or trapping. The *Agave* leaves and chupandilla pit suggest such collecting activities as leaf-cutting and fruit-picking while the milling stones and mullers may indicate seed-collecting. The two hybrid corn cobs suggest they were involved in agricultural activities. This corn may have been ground into a gruel in the metates with the mano and boiled in the Purron Coarse flaring-rim bowl, for one of the two rims has charred remains in its interior. It might be added that gloss on one microblade suggests that the blades (and chips?), perhaps hafted as side blades, were used in cutting plant remains such as corn stalks, husks, *Agave* leaves, kernels of corn from the cobs, and so forth.

The mammals, while butchered outside the cave, may have had the meat further prepared for eating by cutting with blades or flakes and then roasting on the hot rocks in Square S6E2. The presence of the milling stones and mullers in the area of this same hearth also suggests that seeds were roasted.

The 2 tecomates (4 rim sherds of Purron Coarse from 1 tecomate vessel and 1 rim of Purron Plain and 5 body sherds of 1 vessel of Purron Plain) and perhaps 2 short-neck ollas of Purron Coarse (represented by 2 rims of different types) may have been used for storing food as well as for storing and collecting water. It might be added that this pottery seems to have been made elsewhere and the whole vessel brought into (and broken in 9 rim sherds and 58 body sherds) Purron Cave (see also Vol. 3 of this series, Chap. 2).

The possible flint core (of undetermined type) in Square S4 plus the flakes in the south end suggest that someone was involved in flint-knapping activities. The fragmentary core and 3 of the flakes have prepared striking platforms; the wide flakes on the core as well as the cobble hammer indicate that the latter was probably the type of percussion implement used to

remove the flakes and prepare the core. The evidence from Zone K does not indicate whether any of the flakes were made into other implements, and we might add that both the crude and fine blades, while made by a similar technique, had evidently not been fashioned during their stay in the cave; there were neither obsidian chips nor polyhedral cores on the floor.

The 9 ground stone implements, as well as fragments of broken pebbles or boulders, suggest that these implements were ground out during the brief occupancy in the south end of the cave. The two mullers were probably river pebbles brought into the cave and then used in a round-and-round motion on the milling stones. These were especially selected boulders brought into the cave for this purpose. The same is true for the trough metate. A long flake was knocked off one flat surface and the large flake scar ground in back and forth by a mano. The oblong mano was made from a flattish ovoid boulder that had its ends chipped off to give an oblong outline and then was used in a back-and-forth motion in a trough metate; grinding its two surfaces as well as parts of its flattened ends. The manufacture of the lipped-saucer metate probably took more effort. Here again, a large flattish boulder was selected, chipped around its edges to give it its saucer shape, and then these edges were ground. The interior was also initially gouged out (by flaking) and then ground to give it a lipped appearance..

Evidence of other activities is limited. However, the split bone awl, perhaps ground into shape from a splinter (elsewhere), as well as the flakes and blades, suggest tailoring leather (skinned and fleshed elsewhere). The 41 sticks (2 lacking bark, one of which is burned) and the 9 fragments of bark may indicate some woodworking, but just what the finished products of these activities were is unknown.

The distinctive artifacts, particularly the pottery, are the basis for establishing this floor as a component of the Purron Phase. Two radiocarbon determinations—1900 B.C. \pm 190 years (I-757) and 1950 B.C. \pm 180 (I-762) averaging 1925 B.C. \pm 131—suggest that the occupations took place roughly between 2300 and 1800 B.C. (*Radiocarbon* 11: 94, 95).

The Way of Life of Zone K¹

Overlying Zone K in the south portion of the cave from about S3 to S8, between the E3 and W1 axes, was a thin (maximum 20-cm.-thick) layer of yellow loess very similar to that of the lower portion of Zone K. On top of this thin layer of yellow loess was an ash floor that, north of S2 and south of S9, blended into the heavy charcoal capping of Zone K. We believe

this thin ash layer, Zone K¹ above Zone K, represents a later separate occupation. This occupation covered only about 22 to 25 square meters in the south end of the cave. One shallow (10-cm.-deep) fireplace about 75 cm. in diameter had its center at S6E.30. A smaller pit 30 cm. in diameter was located in Square S8E3 (Fig. 40). These factors and the sparsity of artifacts suggest an occupation by a very limited number of people (a microband). Further, both sets of data, as well as the thinness of the overlying ash layer, suggest an occupation of short duration. On the basis of the meager evidence of 2 chupandilla pits and 4 primitive corn cobs, it would appear that the occupation took place from the end of the rainy season in August to the early fall in October—perhaps during a single harvest.

During the harvest of the corn and fruits they also may have hunted or trapped, netting a single cotton-tail rabbit. This suggests a diet primarily of agricultural produce. The 18 battered fragments of metate-milling stones, 2 of which revealed the straight parallel scratches one finds on metates, tends to confirm such an estimate. The concentration of these grinding stones for preparing the corn is in the southeast corner of the excavation, indicating the area of food preparation. The associated obsidian fine blades and the chips might have been used to shuck the corn as 2 of the cobs reveal cut glumes; of course, the tool could have had a variety of other uses. Exactly what the cobble hammer was used for is difficult to determine; there are neither many chips nor smashed bone in the deposit. Perhaps it was also used in food preparation. The sherds of 6 different pottery types, except for 4 Purron Coarse body sherds and 1 hemispherical bowl rim, are distributed around the west, south, and east edges of the occupation and seem to belong to two plain tecomates of Purron Coarse and one long and one short flaring-neck olla of Purron Plain. Seven sherds of 4 other pottery types may have belonged to 4 other vessel forms of indeterminate type. None of these showed burning or adhering materials so we would suggest that they served for water storage or for storage of the agricultural produce. One of the Purron Coarse body sherds of a hemispherical bowl in Square S8E1 just south of the fireplace did, however, have adhering carbon, perhaps indicating that a hemispherical bowl was used for cooking food (see also Vol. 3 of this series, Chaps. 2, 3).

There is little evidence of much manufacturing during the brief summer-fall stay of this microband; however, the metate-milling stones could have been ground into shape from river boulders during their

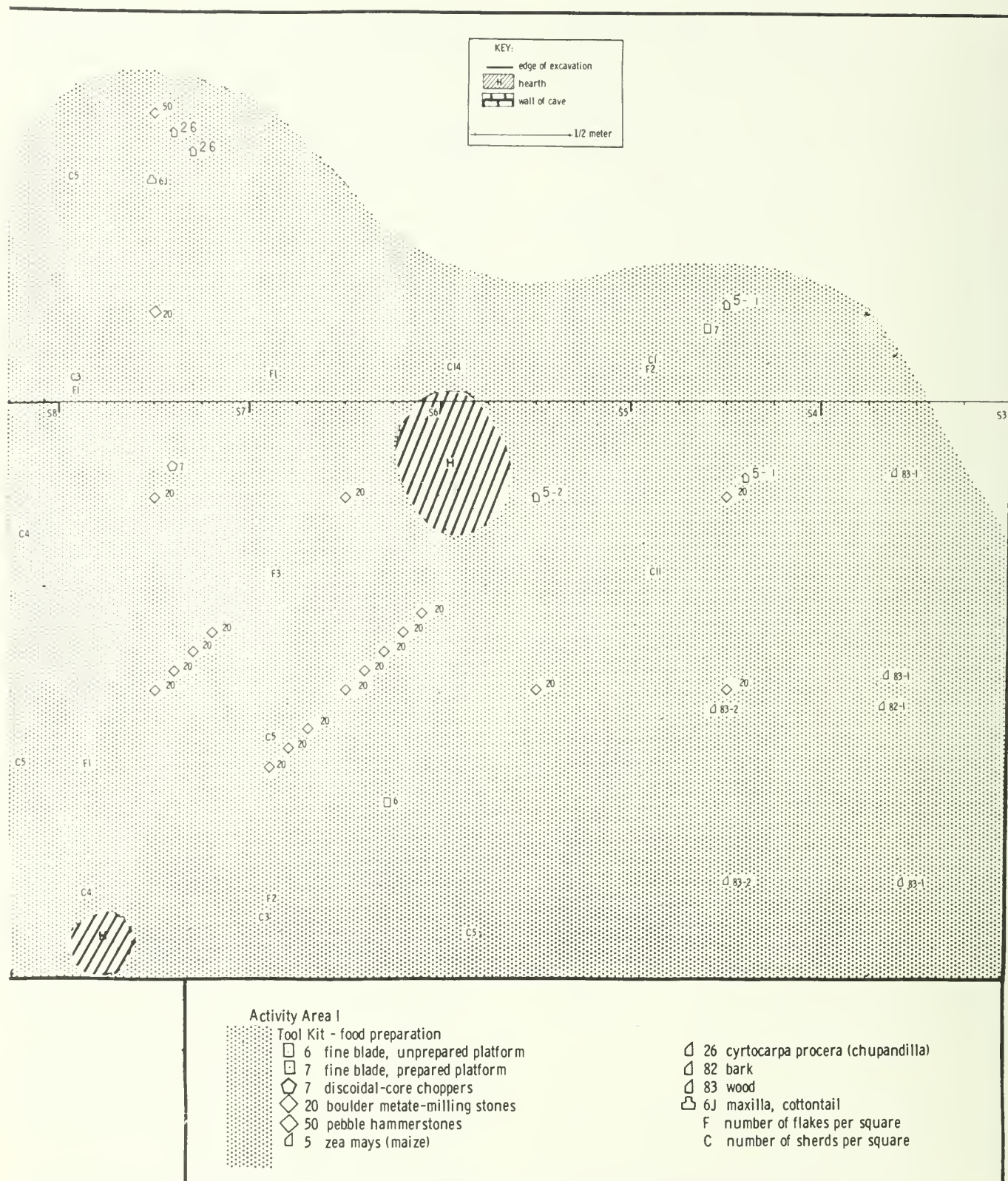


Fig. 40. The activity area of Zone K1 of Tc 272 with a key to its hearths, artifacts, and ecofacts.

occupancy and the 7 pieces of wood (3 without bark) and 1 piece of bark do hint at some woodworking activities.

The sherds indicate Zone K¹ was a Purron component and four radiocarbon determinations (I-666, I-670, I-570, I-753) indicate it occurred about 1531 B.C. \pm 91 (*Radiocarbon* 11:93, 94).

The Way of Life of Zone J

Zone J was relatively thin (10 to 20 cm.) and composed of brown-gray soil, capped by a definite charcoal floor. Much of the lower portion of this soil appears to be angular particles that had eroded off the roof, in addition to windblown silt. The whole zone covered an area of from 75 to 80 square meters. Fifty square meters of it were covered by an ash and charcoal floor (from 5 mm. to 10 cm. thick) that was prominent in the area between the S3 and S6 axes. One rock-filled roasting pit about 10 cm. deep and 60 cm. in diameter was centered at about N2W.5, while a more irregularly-shaped one about 15 cm. deep, a meter long, and a half-meter wide was in Square S3E1. There was also a huge hearth in Squares S5 and S5E1, about a meter wide, 1.5 meters long, and about 10 cm. deep, as well as a small (30 cm. in diameter) round shallow (10-cm.-deep) depression of charcoal centering at S2W1. There is a good concentration of artifacts around a southern roasting pit and the smaller hearth or cache pit, from roughly S3.5 to about N1 from E3 to W2, which we are calling Activity Area 2. The northern roasting pit has a sprinkling of artifacts north of it to N8 (Activity Area 1) while the southernmost large hearth had an even less impressive concentration of artifacts around it (Activity Area 3) (Fig. 41). Whether these are three occupations by microbands or a single macroband intermittent stay is difficult to decide; still, all three have grinding stones and corn, suggesting a wet-season occupation. Activity Areas 1 and 2 have coyol and cosahuico fruit pits suggesting fall visits, and Areas 1 and 3 have bones of seemingly the same dog. Thus, although the evidence is slim, it does suggest a summer-early fall occupation or set of visits by a macroband.

While preservation was not good, particularly in the southernmost activity area, there are some hints as to their subsistence. The deer bone may indicate some hunting, the rabbit bone a little trapping, and the dog bones some keeping of domesticated animals. The *Agave* leaves, *Opuntia* leaf and coyol and cosahuico fruits may indicate leaf and fruit collecting, perhaps in the basket, while the corn cobs and gourd frag-

ments show they did engage in some agriculture. In fact, this macroband visit away from their permanent hamlet homes may have had as its primary purpose the gardening and harvesting of a crop in the nearby river flats. Estimates of their diet is speculative at best, but we guessed in Vol. 1 of this series (Chap. 15) that 43% of their food came from domesticated plants, 35% was of meat, 19% from wild plants, and 3% from a domesticated dog.

Evidence of food preparation is slightly more convincing. All three activity areas have corn cobs with cut glumes as well as grinding stones, suggesting that corn was ground into a gruel or *masa*. One rim sherd of Ajalpan Fine Red of a flaring-rim bowl in Square S6E1 had carbon adhering to its inner surface, suggesting boiling of this gruel or other food. The lack of comales seems to indicate that tortillas were not made, and it might be added that the rim sherds suggest that the vessels were mainly tecomates (6) and long-necked ollas (2) of the sort that could have been used for the storage of water or food. The fruits, *Opuntia* and *Agave* leaves, small shells, corn leaves, and one gnawed corn cob indicates some food was eaten raw, while the meal may have been roasted on the rock-filled hearths.

While the subsistence pattern of each of the activity areas was more or less similar some of their subsidiary activities were not. The group in Activity Area 1 seems to have been involved in weaving, for we found a pierced sherd disk and a twisted cotton yarn made with a spindle whorl. Further, there were both *Agave* leaves as well as *Agave* fibers, and cut *carrizo* in association with a split-stitch woven basket which has as its basic elements the raw materials mentioned above.

The southernmost activity area had most (58 of 64) of the flint and obsidian chips (3) as well as the 2 scraper-planes that could have been cores and 2 fine bifaces that probably were pre-formed. It would seem that what little flint knapping was undertaken was done in this area (Area 3). Three of the flakes and one blade and one scraper (in Area 2) had prepared striking platforms, suggesting pressure or indirect percussion chipping. The bifaces, scraper-planes, and chopper, however, indicate they made these by percussion. The obsidian blades and ground stone tools had no associated debitage of the same materials so they were probably made elsewhere.

The 2 fragments of celts and 2 rather large sticks in the southernmost activity area (3) suggest that some wood-working was undertaken by these people. The celts, however, would seem better adapted to

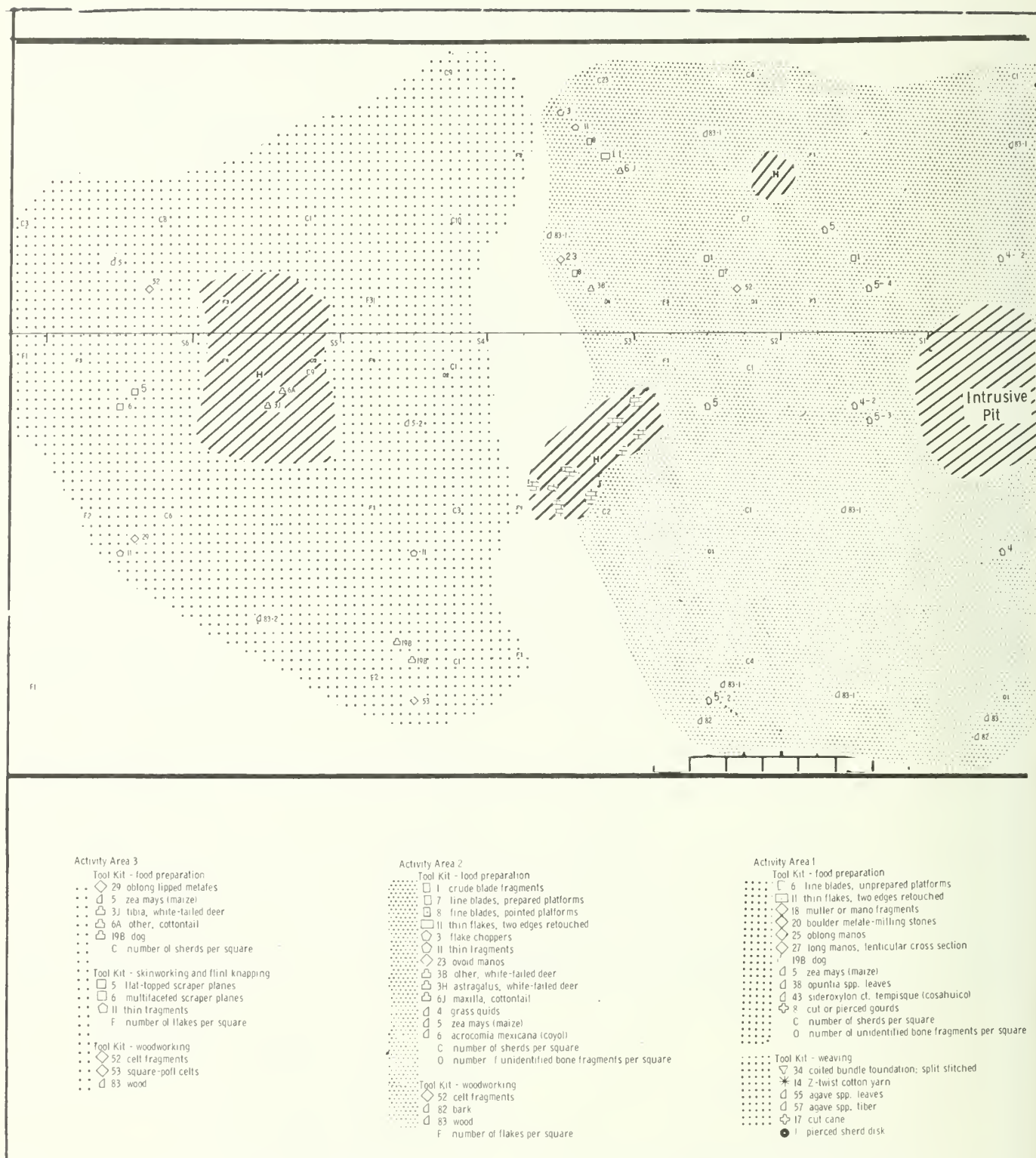
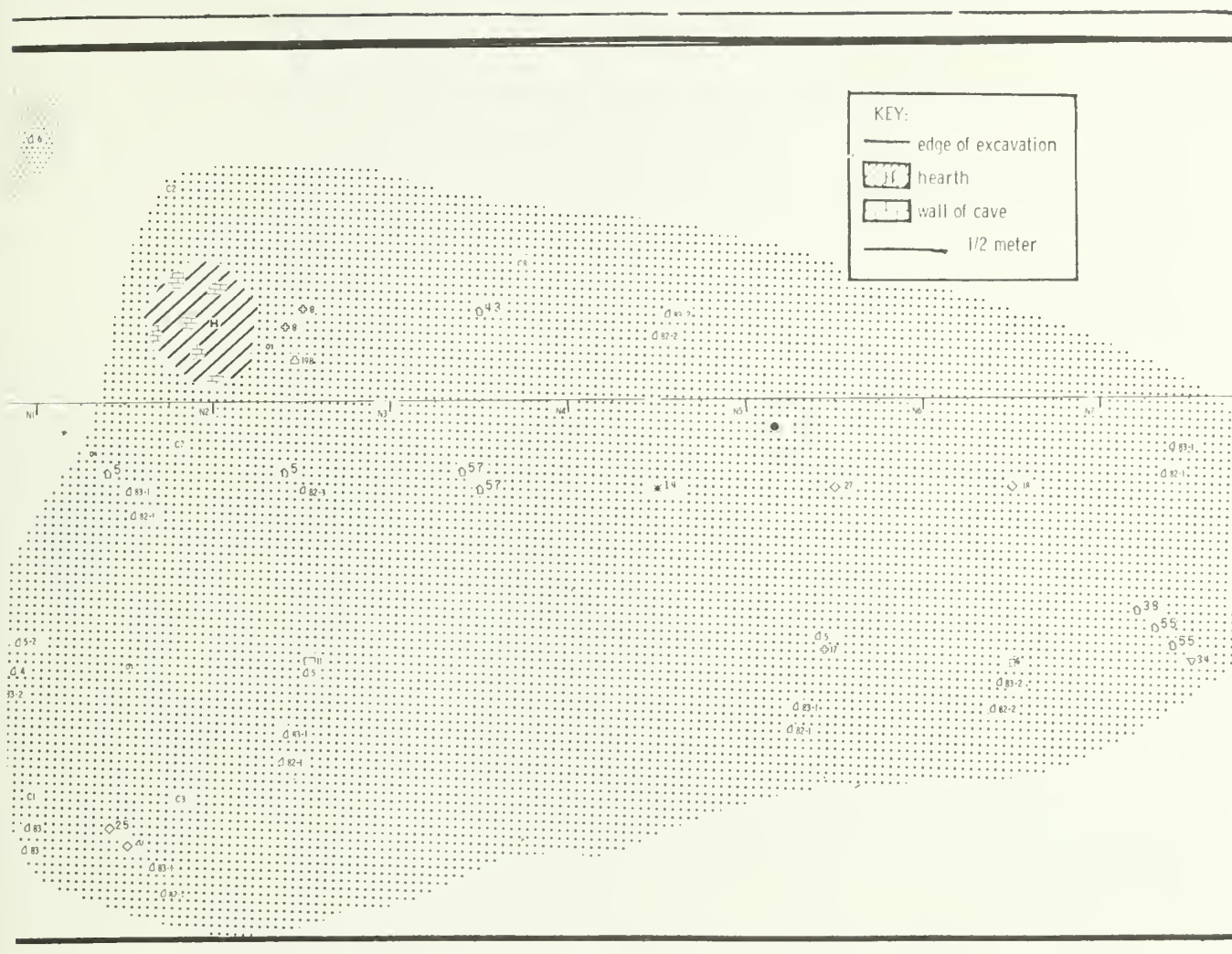


Fig. 41. The activity areas of Zone J of Tc 272 with a key to their features, artifacts, and ecofacts.



(Fig. 41 continued)

cutting sturdier stuff than the 2 sticks. Perhaps the end products of the celt activities were utilized in construction in their real hamlet homes.

Woodworking could have been in both Activity Areas 2 and 3 for there were sticks in each of them; both areas also contained a celt.

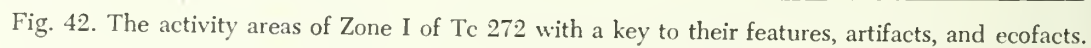
The preparation of skins of deer, rabbit, and dog could also have been undertaken in Area 3 by the bifaces and scraper-planes, as well as in Area 2 by the various blades, bifaces, chopper, and side-scraper, but there was little secure evidence that such was undertaken.

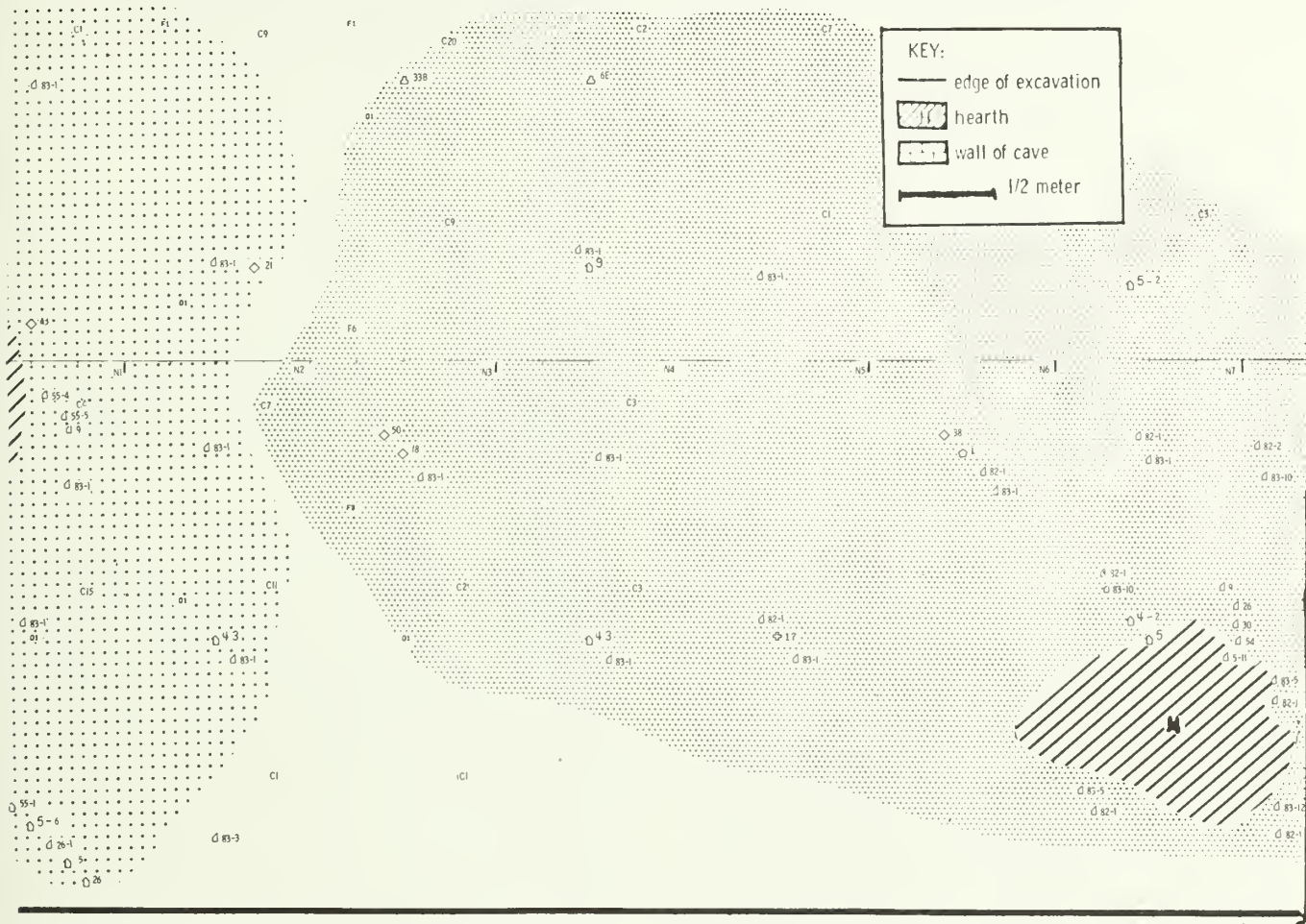
Although our evidence is meager as to the activities of this summer-early fall macroband occupation, its temporal position is on secure ground. The celts, blades, and percentage of pottery types indicate it occurred early in Ajalpan times, roughly 1500 to 1200

B.C. Further, one radiocarbon determination of 1380 ± 170 B.C. (I-565) (which we found unacceptable because of possible mixture with Zone I on Square N1) probably does in fact date Zone J (see also Vol. 4 of this series, p. 26).

The Way of Life of Zone I

A well-defined Zone I not only covered all of Zone J but probably extended north into squares between N10W1 and N10E3—between 90 and 100 square meters. Most of the zone seemed to be chalky yellow silt, probably blown into the cave from the lower reaches of Purron Canyon since the stratum was about 30 cm. thick in the south part of our excavation, thinning out to about 10 cm. in thickness in the north end. About 50 square meters of this loess from N10 to S5 plus parts of Squares S6E2, S7E2, S7E3, S8E2, and





(Fig. 42 continued)

S8E3 were either burned or covered with a thin layer of ash or charcoal. Again, this burned area is divided into two interconnected areas, one north of N2 (Activity Area 1) and a longer, narrower, southern one extending to S6 (Activity Area 2) (Fig. 42). Both have hearth areas in them, one in Square S2E1, about a meter in diameter, and a large oval one in Squares N8E3, N8E2, N7E2, and N7E3, about a meter wide and 2 meters long (north and south). Cosahuico, chupandilla and corn cobs and corn quids (all wet season-early fall plants) are distributed over the whole area; it evidently was occupied by a macroband, at least in that season. However, spring plants—pochote, grass quids, and *Acacia* pods—occur only in the north area (Activity Area 1). We interpret this as a spring microband occupation of the north part of Zone I.

Thus, we believe that, initially, the north end of Zone I was occupied by a microband in the spring and that during the summer and fall a macroband occupied the whole top of the zone.

The spring microband's activities in the north end of the cave (Activity Area 1) seems to have been mainly collecting wild plants and preparing them for food, either by hammering or chopping, and perhaps later roasting them. Further, the large amounts of wood, bark, and cut *carrizo* in this area suggest that they may have been involved in woodworking, as well. The later, larger occupation (Activity Area 2 and part of Area 1) seems to have been involved in a wider range of activities. The bones of at least a single deer suggest hunting and the rabbit and bird bones may indicate hunting and/or trapping. *Agave* leaves were

cut and shells were collected. Cosahuico and chupandilla fruit was picked and a corn crop harvested from the orchards and fields adjacent to the lake formed by Level 1 of Purron Dam (see Vol. 4 of this series, pp. 92-93).

Very rough estimates of the diet during the total occupation indicate that about 52% of their diet came from agricultural produce, 31% from meat, and 17% from wild plants (see also Vol. 1 of this series, Chap. 15). Choice parts of animals killed and butchered elsewhere were brought back to the cave; perhaps then some of the meat was cut by blades, chips, or choppers. Six of 11 bone fragments, 1 rabbit bone, and a deer femur show evidence of burning, suggesting some meat was roasted over the southern hearth. Seeds (after being ground in milling stones by the mullers) and the *Agave* leaves (after they had been cut) were also roasted, perhaps over both hearths. Kernels had been cut off at least two of the cobs by one of their sharp edge tools or flakes. Lime incrustations on at least 5 Rio Salado Gray sherds suggest that kernels may have been soaked to make nixtamal. The manos and the possible metate may indicate that the *masa* was later ground. A large number of sherds of Rio Salado Gray, as well as some of Canoas White and Canoas Orange-brown, had carbon adhering to their interior, suggesting that some food was cooked in some of the 12 fragments of bowls we uncovered. The rim sherds suggest that at least a long-flaring-neck olla of Ajalpan Coarse Red, a long and a short-flaring-neck olla of both Rio Salado Coarse and Quachilco Mica were used, perhaps for food or water storage. Some of them may have rested on the pot rest of Canoas Heavy Plain (see also Vol. 3 of this series, Chaps. 4, 5).

The 3 blades, 12 flints and 1 obsidian chip, a chopper and 3 cobble hammerstones indicate flint knapping. One area where this actually occurred seems to have been around N3E1 in Area 1 where a hammer and three chips occurred, with 6 chips and the chopper and an abrader hammer nearby. The rest of our evidence of flint knapping occurs around the southern fireplace. The hammers indicate the use of percussion flaking; the chopper was completely made by this technique. The flakes and blades, however, may have been formed by indirect percussion, perhaps using the abrader hammer as the punch. Two of the flakes have prepared striking platforms. One snapped blade shows evidence of pressure along two of its longer edges.

As mentioned previously, there are hints of wood-working in both Activity Areas 1 and 2. The abrader saw, flakes, and blades were possibly tools of the trade.

It must be added that most of the wood and bark occurred in Activity Area 1, which had better preservation. The pottery seems to have been manufactured outside the cave, and the 18 or more vessels of 12 pottery types were brought into it for temporary use. The 30 odd sherds of 4 Ajalpan and 2 Purron pottery types were probably not brought into the cave by the inhabitants of Zone I, but dug up by them in their excavation of the southern hearth as most of these sherds occurred in that area.

The sherds seem to indicate that Zone I be considered an Early Santa Maria component. The similarity of its sherds to those from the earliest level of Purron Dam (Tc 15), which is radiocarbon dated as 800 B.C. \pm 60 (SI-124) (*Radiocarbon* 7:250) as well as to other dated components (such as of Canoas Ts 367) and Zone D of Coatepec Ts 368e, suggest that Zone I was occupied in the general time period from 600 to 850 B.C.

The Way of Life of Zone H

Zone H is composed of yellow-brown fine soil that seems to have been blown onto Zone I from down Purron Canyon. It varied in thickness from 10 to 20 cm. with a slight tendency to be a little thicker to the south. It extended from the S10 axis to beyond the N8 axis in a 4-to-5-meter strip between the E3 and W1 or W2 axes, probably covering between 90 and 100 square meters. Much of it was covered by a well-defined charcoal or ash floor. In the south end from S7 to N4 this covering was about 3 meters wide (roughly from E2 to W1) while to the north it was four or five meters wide. Only one well-defined hearth (about 75 cm. in diameter with a maximum depth of about 15 cm.) occurred in Square N8E1 (Fig. 43) but there were two smaller charcoal-filled, well-fired depressions. One, about 50 cm. in diameter, centered at S2.6E.1 while a long east-west (1.25 meter) narrow (.60 meters) charcoal depression centered at about S3.9E1.2. We believe all were used as hearths. The northern hearth has a concentration of ecofacts and artifacts just south of it to the N3 axis (Activity Area 1) while the southern one has another concentration extending southward to the S8 axis (Activity Area 3). Between these two is a scattering of artifacts near the smallest hearth and associated with it are the majority of the artifacts, some plant remains, some flakes and sherds, and no animal bones. We have designated this Activity Area 2, but it could be merely the peripheries of either or both of the activity areas north and south of it. On the basis of the three hearths and the three associated activity areas, we believe three groups occupied the

floor. What is more, each one of them has fall plants and summer corn, so it would seem that the three groups were living in the cave contemporaneously. In fact, we have classified Zone H as a late summer-early fall macroband occupation. Further, the plant remains suggest that perhaps this was some sort of short-term macroband camp for harvesting the corn and orchard fruits (as well as *Agave*) that could have grown in the mud flats of Stage 2 of Purron Dam just to the south. Once the harvest was over, the groups returned to their permanent homes in the nearby hamlets and villages, taking most of the harvest with them.

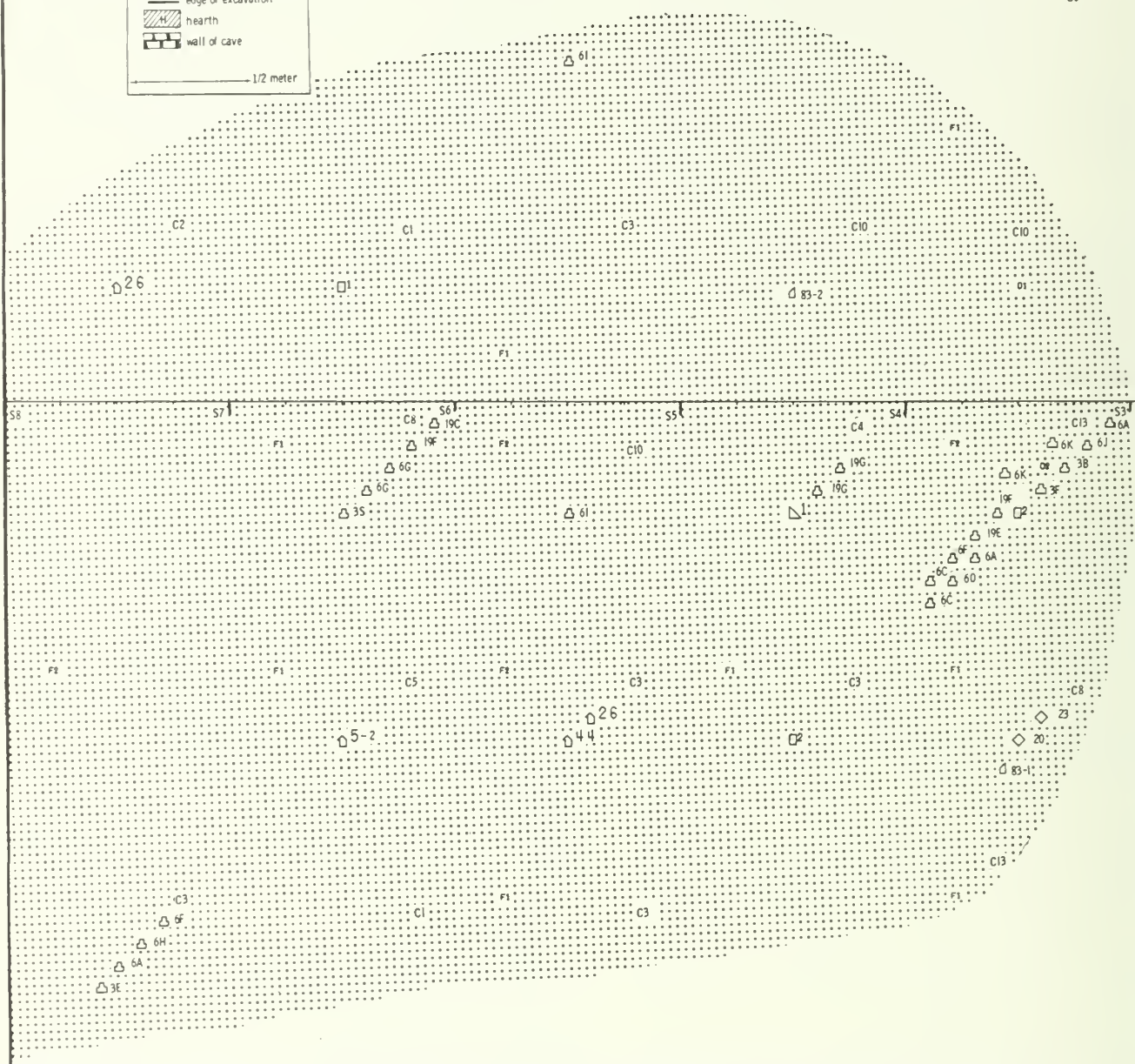
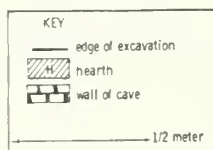
One of the main activities of all three areas was subsistence—that is, getting enough food into their mouths to sustain life while they harvested. A deer evidently was killed, perhaps with the atlatl dart tip we uncovered, and at least six rabbits, one gopher, and a quail were caught (by traps?) during this occupation. *Yucca* and sotolin leaves were collected. A large number of *Agave* leaves were cut (although most of them don't seem to have been used for food). Domesticated sapotes, an avocado, and perhaps the chupandilla, cosahuico, and corn were also harvested, possibly in the field or orchards adjacent to the lake formed by Stage 2-3 of Purron Dam. Estimates on their sustenance is at best an educated guess, since only a few squares had full preservation. Animals represented by the bones had been calculated as of 1 deer, 6 rabbits, 1 dog, 1 gopher, and 1 quail, and would represent about 30 liters of meat. The agricultural produce, taking into account the preservation factor, might be calculated at 33.6 liters, while wild plants would only represent about 5.6 liters of food. This would give a total of only about 70 liters of food—a very small amount for a macroband even for a very short time. On the basis of these calculations, about 48% of their diet would have been agricultural produce, 43% meat, and 9% from wild plants (see also Vol. 1 of this series, Chap. 15).

Discerning some of their food preparation activities rests on a slightly firmer basis. Animals seem to have been butchered elsewhere, but burned bones (particularly in Square S3E1) would seem to indicate that bones and the adhering meat was roasted, perhaps on the raw coals represented by the charcoal patch in Squares S3E1 and S3E2. The excavation of these bones with a number of blades and chips suggests that these were the knives used for cutting the meat. They also may have been the sort of tool used in removing the kernel from the cob with cut glumes found in Square N1E3. The manos in Square N7E1 may also have been used to grind up the corn kernels at least. The mano-

mullers and milling stones around S3 may have served to grind up the seeds of plants. The association of the mano and animal bones around the single hearth at S2 suggests that some of this food may have been roasted, while Rio Salado sherds with adhering carbon around S3 may be considered evidence of food cooked in bowls. Rim sherds indicate that at least 12 bowls were in the cave. There are also the remains of at least 7 ollas that could have served for food or water storage. The gourds also may have been used for water storage. Much food, such as the fruits and leaves, were eaten raw and, with the *Agave* leaves and corn husks and tassels, chewed quids spat onto the floor.

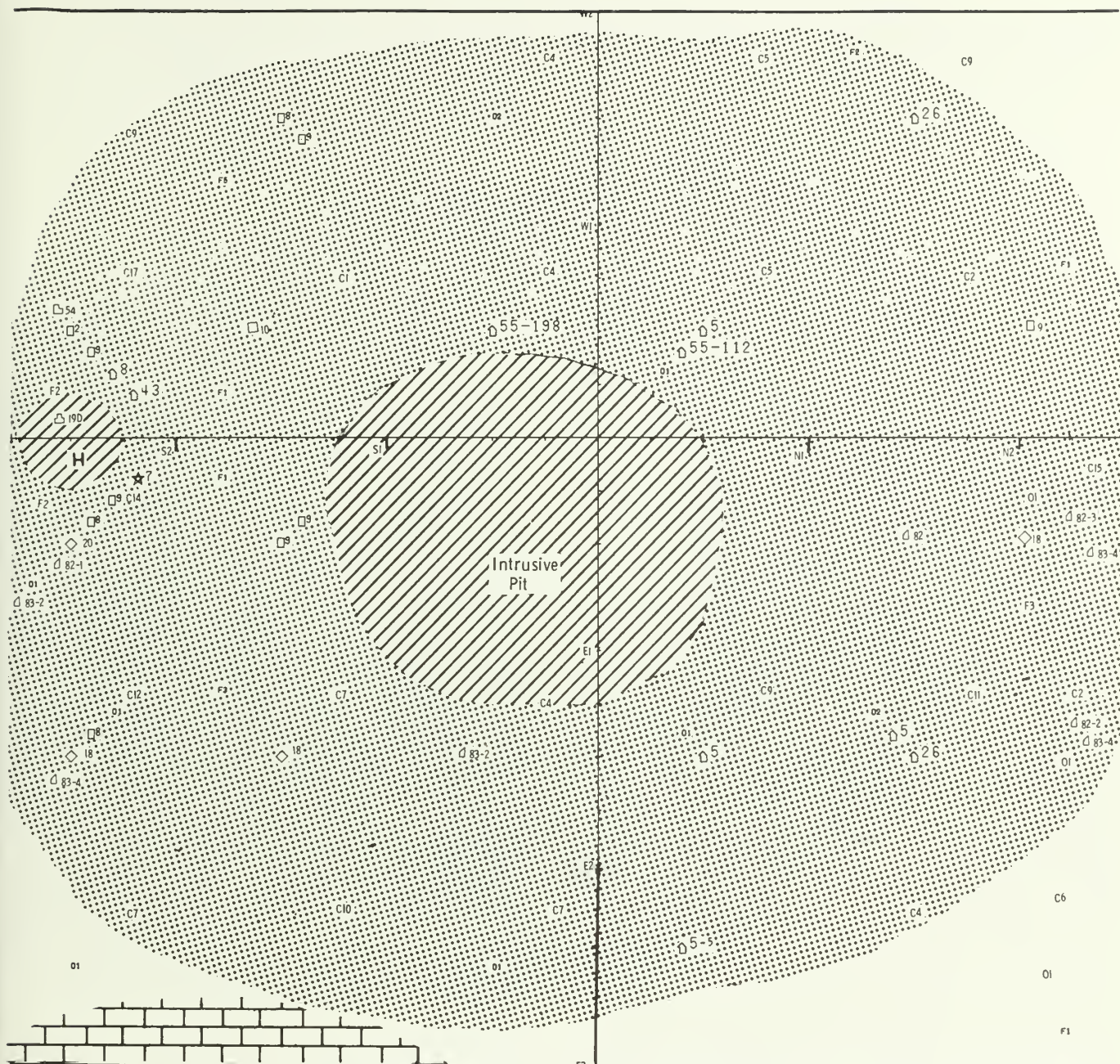
A piece of deer skin in Activity Area 2 is evidence of one of their technological activities. The fur is still adhering to one surface, but the other side has definitely been scraped and the subcutaneous fatty tissues removed. The finding of an end-of-blade scraper in an adjacent square suggests that this was the tool utilized. Wear on the ventral surface next to the cutting side suggests the scraper was pushed forward (and back) like a wood plane. One edge of the skin has been cut and the associated blades and flint flakes may have been used to cut the hide into the desired shape. The fragment of a needle in Square S2E1 suggests that the leather was sewn. Examination of the deer hide under a microscope revealed that it was full of tiny particles of carbon and, since it came from a square with some ash and little carbon, we have interpreted this as indicating that the hide had been cured by smoking.

There is evidence that some flint knapping was done during their brief cave visit, as we found on Zone H 32 flint chips, one possible flint core, 15 obsidian chips, as well as 8 chipped stone artifacts, an ovoid mano with pecked ends, and a piece of antler tine with a couple of nicks on its tip (Activity Areas 2 and 3). Six of the chips have a prepared striking platform, while one has an unprepared platform, and the core has evidence of percussion blows being struck from it. We believe that flakes were struck from cores (or the core), mainly with prepared striking platforms, by percussion blows by a hammer. Perhaps the hammer used was the ovoid mano that has pecked marks on its two ends as the result of also being used as a hammer. We found only 3 obsidian blades with adhering striking platforms and these platforms were all small and pointed. As indicated in Volume 1, we believe, on the basis of the flake scars, these blades (and perhaps the obsidian flakes and other blades) were struck from a barrel-shaped nucleus or polyhedral core (not found in the cave) by indirect percussion blows. The point tip and 6 blades, after they had been snapped, show



Activity Area 3

- | | | |
|-------------------------------------|----------------------------------|--|
| Tool Kit - food preparation | 3E phalanx, white-tailed deer | 6J maxilla, cottontail |
| 20 boulder metate-milling stones | 3F metapodial, white-tailed deer | 19C rib, domestic dog |
| 23 ovoid manos | 3S teeth, white-tailed deer | 19D vertebra, domestic dog |
| 5 zeas (maize) | 6A other, cottontail | 19E radius, domestic dog |
| 26 cyrtocarpa procera (chupandilla) | 6C tibia, cottontail | 19F mandible, domestic dog |
| 44 diospyros digyna (black sapote) | 6D femur, cottontail | 19G teeth, domestic dog |
| 1 point tip | 6F ulna, cottontail | |
| 1 crude blade fragments | 6G radius, cottontail | |
| 2 fine blade fragments | 6H humerus, cottontail | |
| 3B other, white-tailed deer | 6I ramus, mandible, cottontail | |
| | | O number of unidentified bone fragments per square |
| | | F number of flakes per square |
| | | C number of sherds per square |



Activity Area 2

- Tool Kit - food preparation
- ◇ 18 muller or mano fragments
- ◇ 20 boulder metate-milling stones
- ◇ 5 zea mays (maize)
- ◇ 8 persea americana (avocado)
- ◇ 26 cyrtocarpa procera (chupandilla)
- ◇ 43 sideroxylon cf. tempsique (cosahuico)
- ◇ 55 agave spp. leaves
- O number of unidentified bone fragments per square
- C number of sherds per square

- Tool Kit - skin preparation
- 10 end of blade scraper
- 2 fine blade fragments
- 8 fine blades, pointed platforms
- 9 fine blades, snapped, two edges worked
- ☆ 7 round antler needles
- 54 leather strands
- F number of flakes per square

Fig. 43. The activity areas of Zone H of Tc 272 with a key to their features, artifacts, and ecofacts (north section continued on the following page).

evidence of pressure-retouching, perhaps by a tool like the piece of antler tine we found, for the few nicks on its end could have been made when it was a flaker. Chips, artifacts, and the so-called tools of the flint-knapping industry are widely distributed over the floor so a chipping area cannot be determined.

There are also some hints that woodworking was undertaken in Activity Area 1. The 43 pieces of wood (17 with their bark removed), 13 pieces of bark, the cut gourd, the cut *carrizo*, and the celt are direct evidence of this. Other tools also suggest composite tools with at least one part of the tool being of wood. The projectile point most certainly was hafted to a wooden shaft or foreshaft, the end-of-blade scraper's base shows polishing, indicating it was hafted (in either a wood or bone handle) and the snapped fine blades which have both their longer edges retouched showed, upon examination, that one edge was usually retouched and then nicked, while the opposite edge was only retouched. This suggests that they were used as side blades with the unnicked edge set in some sort of handle or haft while the opposite edge was nicked by use (perhaps on wood). It might be added that the nicked edge of one of the specimens also bore some luster on it, suggesting that, besides being used as a whittling tool, it also may have served as a side blade in a sickle, perhaps used in the cutting of our corn or *Agave* leaves. The bone needle was made from a sliver of long bone that they had ground and the mano, metates, muller and milling stones were ground out of river pebbles or boulders, all indicating a stone-grinding industry. The pottery seems to have been made outside the cave, and just what industry the 893 *Agave* leaves were connected with could not be determined.

The pottery and artifacts (particularly the blades) indicate that Zone H is a component of the Santa Maria Phase. Percentages of pottery types suggest the component is of the late part of the Early Santa Maria period, but percentages of vessels suggest the component occurred during the early part of Late Santa Maria. The average of the two Carbon-14 dates (I-568 and I-575) (*Radiocarbon* 11: 93) is 445 B.C. \pm 101 years and seems to indicate that the more recent possible dating and classification is the correct one.

The Way of Life of Zone G

Zone G was a reddish-brown stratum composed of aeolian soils and disintegrated rock from the cave roof. It capped Zone H over most of our area of excavation (about 80 square meters) and was from 10 to 20 cm. thick. It in turn was capped by charcoal and

ash in a 2-meter-wide strip, roughly between E1 and W1, that began in the south at about S7 and ended at N1. A concentration of artifacts in this area and a large hearth in Square S4 designates Activity Area 1. North of the North 1 axis to beyond N8 the charcoal floor expands to cover most of our excavated area (4 meters wide) and there was a second concentration of artifacts, Activity Area 2 (Fig. 44). Further, two charcoal-filled depressions, possible hearths, are located in this area roughly in N6 and in N6E1 and N6E2. The plant remains suggest that the two areas were not occupied contemporaneously; Activity Area 1 has grinding stones, grass and quids, and coyol pits suggesting a late winter-spring occupation, while the north area has avocado, sapote, ciruela, chupandilla and cosahuico fruits which become ripe in the fall, as well as corn, squashes, and lizard bones of the wet summer months. We have interpreted this data as indicating that two separate microbands occupied the cave, one in Activity Area 1 in the spring and another in the late summer-fall in Activity Area 2.

The subsistence system of the spring microband occupation is a difficult one to pin down because of so little plant preservation. However, we do have some indications: the rabbit suggests trapping, the grasses and seeds, collecting, *Agave* quids and leaves, leaf-collecting, and the corn, coyol, and cosahuico, agriculture, or at least the use of agricultural produce. Their diet might have included about equal amounts of meat, vegetal remains, and foods from agriculture. The mullers or manos and milling stones or metates might have been used to grind up the corn and grass seeds, while the various bifaces and choppers could have been used to cut up either the plant or meat foods. The burned vertebrae of a rabbit suggests that meat was roasted on their hearth. The one bowl of Rio Salado Gray did not seem to have been used for cooking and the other rim sherds from the southern area are from at least six different ollas of the sort that could have stored food or water. One long-flaring-neck olla and two short-flaring-neck ollas were of Rio Salado Coarse; there were also rims of a long-flaring-neck olla, a short-flaring-neck olla, and a beveled-rim olla of Quachilco Mica.

Other activities of this spring microband are difficult to discern, with the exception of some possible woodworking. A fragment of a celt was found with wood and bark fragments.

Our information from the summer-fall microband occupation in the northern Activity Area 2 is slightly better. Here we had enough foodstuffs to estimate that about 88% of their subsistence was from agricultural

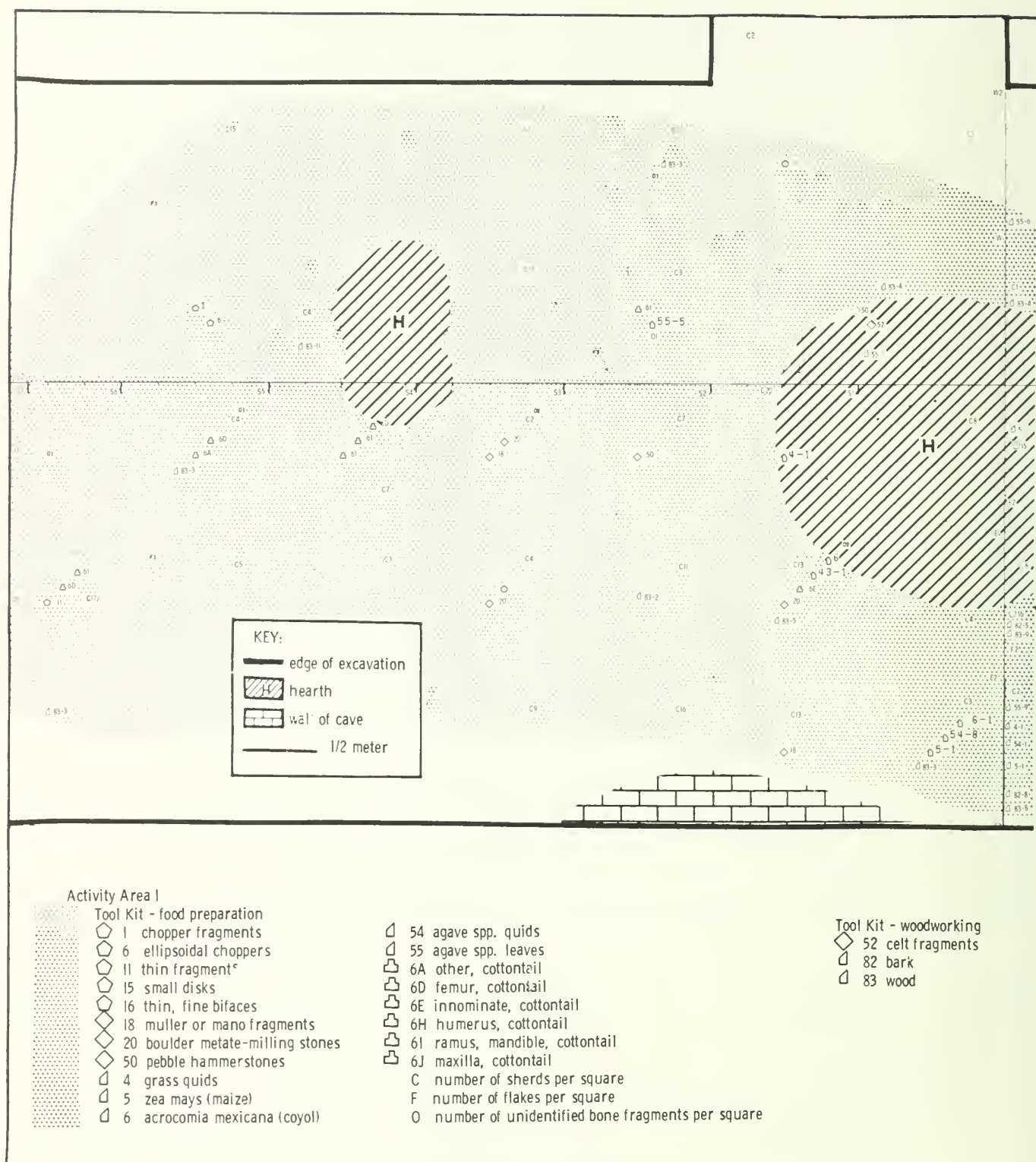
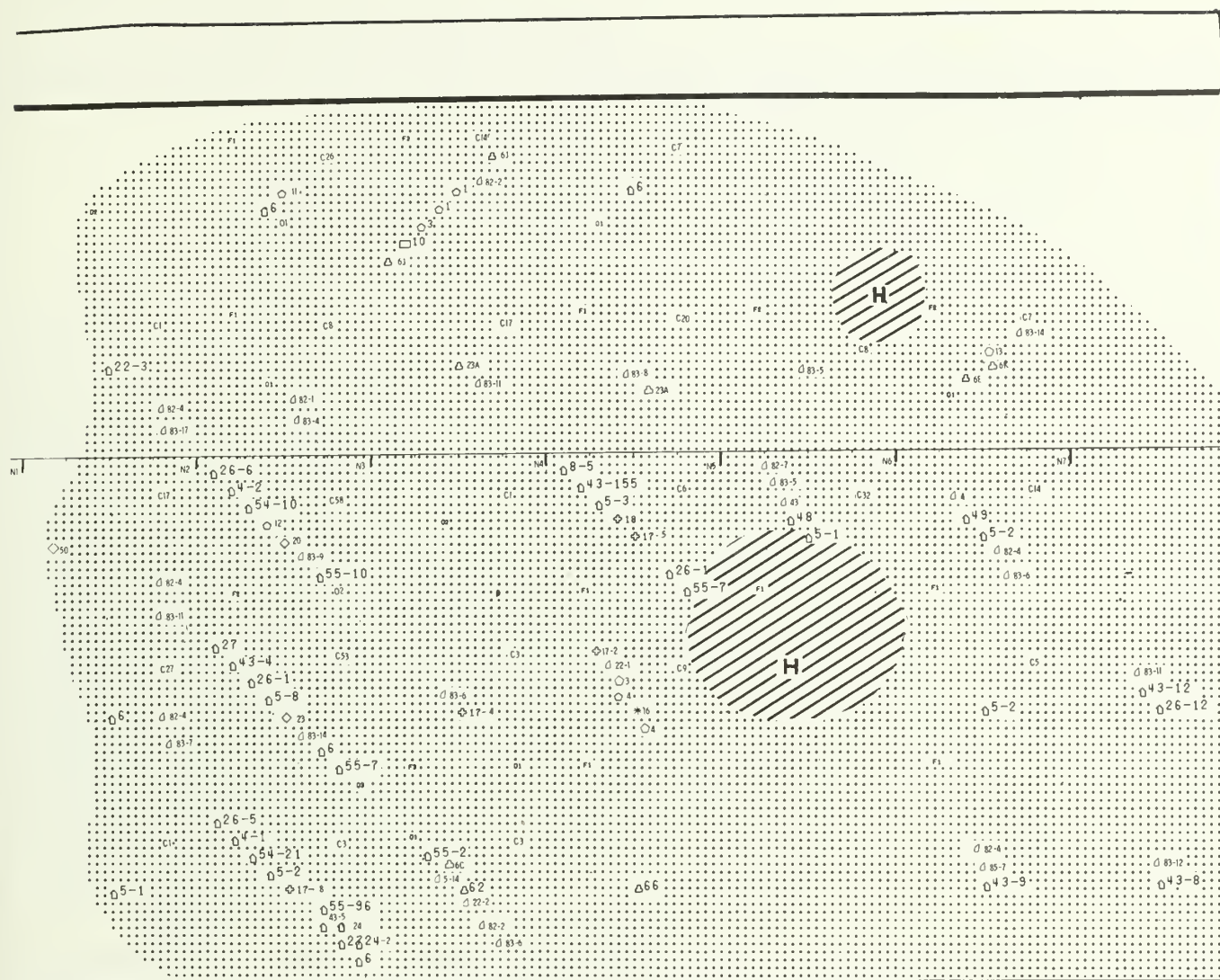


Fig. 44. The activity areas of Zone G of Tc 272 with a key to their features, artifacts, and ecofacts.



Activity Area 2

Tool Kit - food preparation

- 10 thin flakes, one edge retouched
- 3 flake choppers
- 11 thin fragments
- 12 thin, crude, ovoid bifaces
- 13 thin, crude, square-based bifaces
- 20 boulder metate-milling stones
- 23 ovoid manos
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 8 persea americana (avocado)
- 22 casimiroa edulis (white bean)
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)

- 43 sideroxylon cf. tempisque (cosahuico)
- 48 unidentified curcubita spp. (squashes and pumpkins)
- 49 C. mixta
- 54 agave spp. quids
- 55 agave spp. leaves
- 6C tibia, cottontail
- 6H humerus, cottontail
- 6J maxilla, cottontail
- 23A fragments, iguana
- C number of sherds per square
- O number of unidentified bone fragments per square

Tool Kit - woodworking

- 17 cut cane
- 18 pounded sticks
- 82 bark
- 83 wood

Products - string making

- * 16 Z-twist, 4-ply cotton rope

Tool Kit - flint knapping

- 50 pebble hammerstone
- 4 blocky-core chopper
- F number of flakes per square

(Fig. 44 continued)

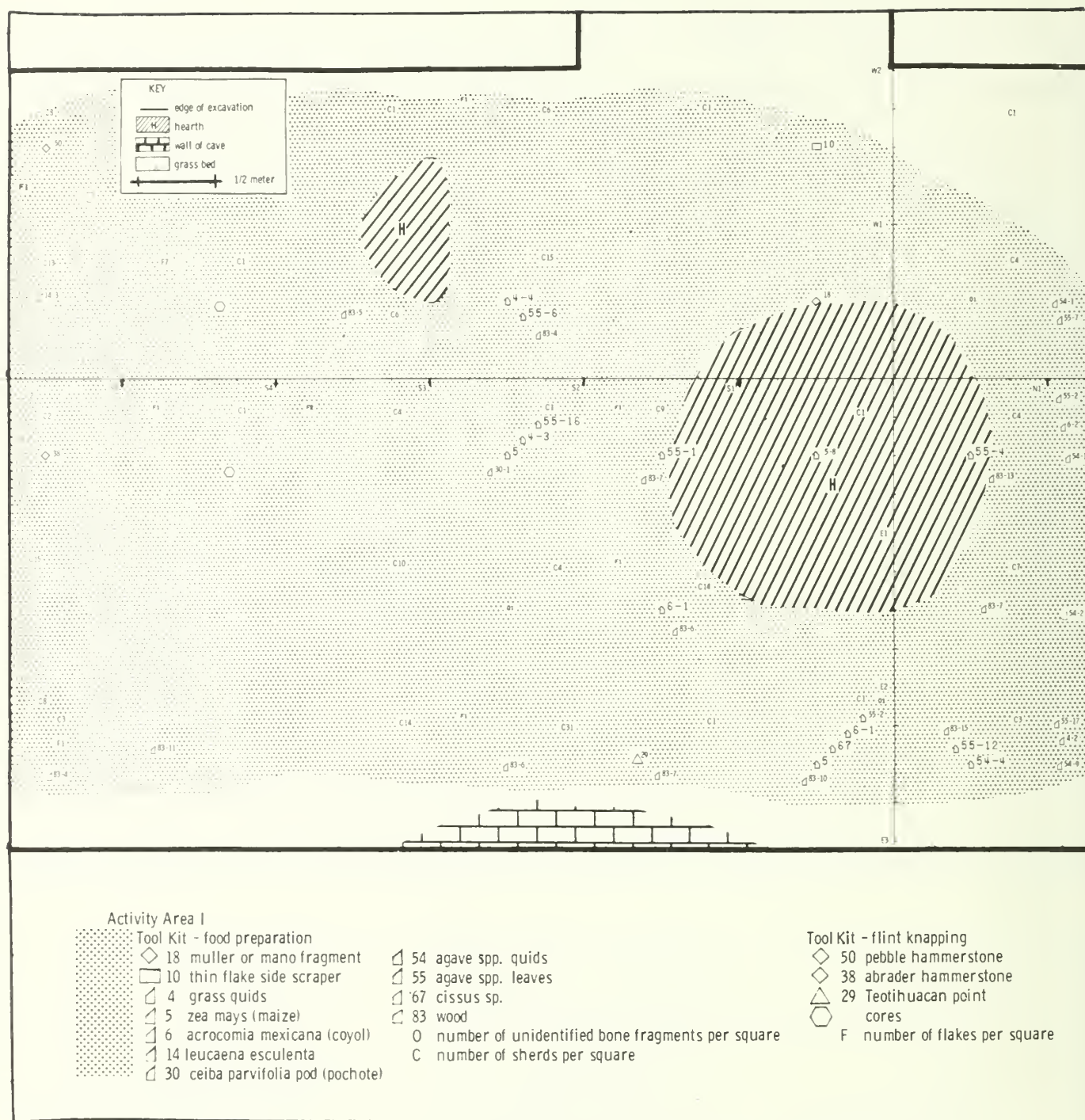
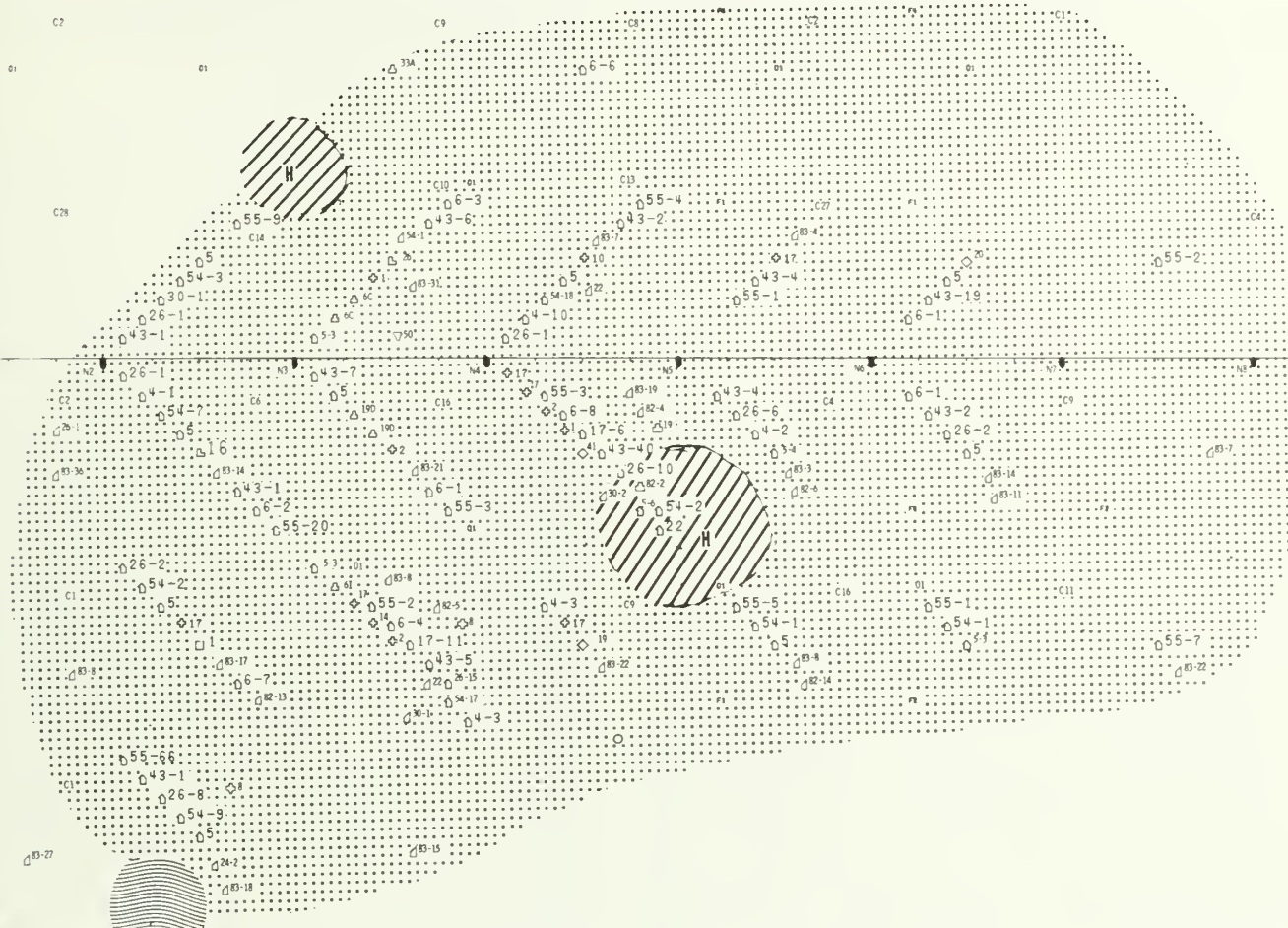


Fig. 45. The activity areas of Zone F of Tc 272 with a key to their features, artifacts, and ecofacts.



Activity Area 2

- Tool Kit - food preparation
- 19 metate fragment
- ◇ 20 boulder metate-milling stone
- ⊕ 21 snare part
- 26 square knot of agave strands
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 17 p. lunatus (sieve bean)
- 22 casimiroa edulis (white bean)
- 24 jatropa neopauciflora
- 26 cyrtocarpa procera (chupandilla)
- 30 ceiba parvifolia pods (pochote)

- 43 sideroxylon cf. tempisque (cosahuicol)
- 54 agave spp. quids
- 55 agave spp. leaves
- 61 ramus, mandible, cottontail
- 6C tibia, rabbit
- 190 vertebra, dog
- 19F ramus, mandible, dog
- 33A bird
- F number of flakes per square
- O number of unidentified bone fragments per square
- C number of sherds per square

Tool Kit - wood working

- 1 scraper-plane fragment
- ◇ 41 rubbed pebble
- 1 polished stick
- 2 cut stick
- 8 cut or pierced gourd
- 14 cut slab
- 17 cut cane
- 82 bark
- 83 wood
- F number of flakes per square

Tool Kit - weaving

- 16 slip knot of agave strands
- 26 square knot of agave strands
- pierced sherd spindle whorl
- ▽ 50 bark cloth fragment

(Fig. 45 continued)

produce, 9% from wild plants, and only about 3% from a rabbit and an iguana (see also Vol. 1 of this series, Chap. 15). Certainly one of the major activities of this late wet season-early fall microband occupation was harvesting agricultural produce. Remains of corn, squash, avocados, white sapotes, chupandilla, cosahuico, and ciruela were found in that area (Area 2). One suspects that much of the fruit was picked because of the orchards around the dammed-up Purron Lake (Tc 15) that was in Stage 3 at this time. Most of the fruit could have been eaten raw. Three cobs, however, had cut glumes, suggesting shucking, while the mano and metate-milling stone suggest the corn was milled. The squash seeds show evidence of having been roasted, as do some of the *Agave* leaves. *Agave* leaves and quids and a single grass quid were collected and some of these leaves, as well as the corn stalk, leaves, and fruit, could have been cut by the side-scrapers, the bifacial tools, or the choppers. These same tools also could have been used in cutting up the meat of the iguana and the one rabbit they caught. Two of the twelve splinters of bone are burned, suggesting meat roasting on the hearth at N6, but none showed evidence of being split for marrow. The best evidence for cooking comes from the ceramic remains. The fragments of El Riego Gray, probably from one outslipping-rim bowl, fragments of a Rio Salado Gray flaring-rim bowl, one fragment of a beveled-rim olla of Quachilco Mica and Quachilco Gray fragments from a flaring-rim bowl, a round beveled-rim bowl, and a sharply everted-rim bowl, all had carbon or burned material adhering to their interiors, suggesting the cooking of some sort of a stew. The four ollas of Rio Salado Coarse may have been used for storage, while the two hemispherical bowls of Coatepec White and Rio Salado Coarse could have been used as dishes (see also Vol. 3 of this series, Tables).

Besides the subsistence, there is evidence of other activities. The hammerstone, the 2 blocky-core choppers and 13 chips are evidence of flint knapping. The objects, the fracture scars on the blocky cores, and one prepared striking platform suggest that tools (such as the ovoid and square-based biface, the bifacial disk, and the flake and ellipsoidal choppers) were made by the percussion method. The five fine flakes of obsidian, the fine thin obsidian biface, and the flake side-scrapers tell us that the inhabitants also did some pressure retouching during their sojourn in the north end of the cave. The S-twisted rope of four Z-twisted cotton yarns also show that they made string, while the wood fragments, the bark, the 19 pieces of cut *carrizo*, and the pounded stick are all evidence of

woodworking. Just what the tools were used for is difficult to say.

The sherds from Zone G indicate that it must be considered a (two) component(s) of the Santa Maria Phase during its later stages of existence.

The Way of Life of Zone F

After the occupation of Zone G a 10-to-20-cm. layer of whitish-yellow very compact silt was deposited by wind on the floor of the cave, followed by an occupation which deposited some ash and charcoal, Zone F. The zone seemed to have covered about 65 square meters; about 50 square meters are capped by ash, charcoal, or burned earth. There were two small (40 to 80 cm. in diameter) burned areas in the north Activity Area 2 with thick (10-cm.) deposits of charcoal (N3.5W1 and N5E1) that were probably hearths. A huge pit about 50 cm. deep and 2.5 meters in diameter had been dug down from the layer roughly in the area of Square E1, as well as an elongated fire pit at S3W1 in the south area (Activity Area 1). Spring plant remains (37 coyols, 28 grass quids, 5 pochote pods, and 3 guaje pods) occurred from one end of the floor (S2W1) to the other (N7E1). All this suggests a brief spring macroband occupation of Zone F. However, in the general area bounded by N3, N8, N3E3, and N8E2, roughly 17 square meters (Activity Area 2), there were many fall plants (2 white sapote pits, 47 chupandilla pits, 92 cosahuico pits, and 17 ciruela pits). All this suggests a fall microband re-occupation of the north part of Zone F around the hearths at N3W1 and N5E1 (see Fig. 45).

Exact estimates of the sustenance of each of the two occupations are difficult to make, but there was enough preservation of plant remains (13 out of 65 squares) to give a fair overall picture of their diet. About 23% of this food came from wild plants, mainly *Agave* quids, grass quids, and a few guaje and pochote pods; 67% from a variety of domesticated plants; and only about 10% from meat, a third from domesticated dogs and the rest from 2 rabbits and a bird. Agricultural plants grown included corn and gourds, but their major agricultural activity seems to have been involved in growing such fruits as chupandilla, ciruela, cosahuico, and white sapote. Since all these plants require a steady supply of water, it seems likely that they were grown in orchards at the edge of the lake made by one of the final stages of Purron Dam. There are few, if any, tools connected with these activities. The slip-knot loop of maguey, of course, could have been used to bundle together some of the corn leaves and stalks, and, of course, it could have served as a carry-

ing loop to bring in bundles of *Agave* leaves that were collected wild, one of the other major subsistence activities. The loops could have been part of snares. This seems very probable for we found wooden triggers for a spring snare. The rabbits very likely were caught in such snare traps. The Teotihuacan point may have been attached to an arrowshaft or atlatl dart shaft that also could have killed the small game. Thus, we have all evidence that the inhabitants of Zone F hunted and trapped.

Seeds of grass, pochote, and huaje may have been ground into flour in the milling stones by mullers, while corn was ground in a metate. The scraper-plane may also have been used for pulping leaves (*Agaves*) and other plant remains. The cutting of the meat of the rabbit and dog may have been done by the side-scraper or the flint flakes. The large roasting pit contained *Agave* leaves and a few charred corn cobs, but there is no evidence (none of the identified bones or the 12 slivers were charred) of other food being roasted. The fact that the majority of the sherds, almost all of Rio Salado Gray, Quachilco Gray, El Riego Gray, and Quachilco Red, had charred remains on the interiors, suggests that one of the commonest methods of food preparation was cooking in pots. One olla of Quachilco Mica, one flaring-rim bowl of Rio Salado Gray, one everted-rim bowl of Quachilco Gray, and one flaring-rim bowl, one outslipping-wall bowl, one hemispherical bowl, and one stepped-rim bowl, all of El Riego Gray, seemed to have been used for cooking or boiling food. Two short-neck ollas of Quachilco Mica, a long and a short-flaring-neck olla of El Riego Orange, and a gourd container may have been used for storage, while a Thin Orange bowl and 2 Quachilco Brown bowls may have been used as eating, or decorative, dishes.

The muller-mano, metate, and boulder metate-milling stone were probably ground out of selected river boulders by the abrader hammer or a tool like it during the brief sojourns on Zone F. Also, some flint knapping seems to have been undertaken during this period in Activity Area 1, for we uncovered 19 flint chips, 3 flint core fragments, 6 obsidian chips, a chipped scraper-plane and a side-scraper. Five chips with adhering striking platforms and the 3 cores indicate that, initially, flakes were struck off blocky cores with prepared striking platforms, probably by a cobble or abrader hammer. The abrader hammer also could have served as a flaker for pressure-retouching the scrapers. The 2 cut and pierced gourds, 3 cut sticks, 2 polished sticks, a spring snare trigger, a cut slab of bark and 6 pieces of cut *carrizo*, show evidence of woodworking

in Activity Area 2. The *carrizo*, the bark slab, and the polished sticks were sawed, while the others were cut or whittled. This occurred with a concentration of 6 flakes, which could have been tools of the trade. No evidence of this was found, but luster on both surfaces of the side-scraper suggests that this may have been the tool used. Also, the rubbed pebble could have served to polish the 2 narrow flat pieces of wood. Exactly what they were used for is unknown, but their cross-section makes one suspect they might have been involved in weaving, although we found no woven objects. The nearest thing to a woven object was the strand of *Agave* with the slip knot. The piece of bark cloth also indicates knowledge of other manufacturing techniques, but there is no evidence it was used in the Zone F occupation.

The pottery types, bark cloth, and Teotihuacan point seem to indicate that Zone F is a component of the Palo Blanco Phase. Further, the percentages of the types of our limited ceramics indicate that Zone F occurred during Early Palo Blanco times.

The Way of Life of Zone E

Zone E, a 10-to-20-cm.-thick stratum on top of Zone F, ranges from yellow to gray in color, with a tendency to being grayer on the upper portions of the stratum, where it fades into ash or vegetal floor, and in the north-central part of the cave floor where there was better plant preservation. We have interpreted these color differences as indicating that the stratum was basically of aeolian yellow loess that became impregnated with ash, charcoal, and rotted vegetal remains which were placed on its surface. The stratum is readily discernible over about 72 square meters of the cave floor and is covered by two large patches of ash that are separated by a huge pit in the general region at S1E1, E1, and N1E1. The southern ash area covers an area of about 19 square meters and has a rock-filled pit about 40 cm. in diameter and 15 cm. deep with its center at about S4.6E.9. The northern patch (Activity Area 2) covers an area of about 25 square meters with a shallow (10 cm. deep) elongated (.75 north-south and .40 cm. east-west) ash-filled hearth with its center at about N5.9. Plant remains and feces reveal spring plants from one end of the floor to the other, mainly grass quids and feces with *Lemaireocereus*, *Setaria* and mesquite in Activity Area 1, while Activity Area 2 also has grass quids, tetecho and *Opuntia* seeds. This suggests a spring macroband occupation probably connected with some sort of feast of *Agave* leaves at the huge central pit. This contrasts with plant remains north of the roasting pit, which not only have spring

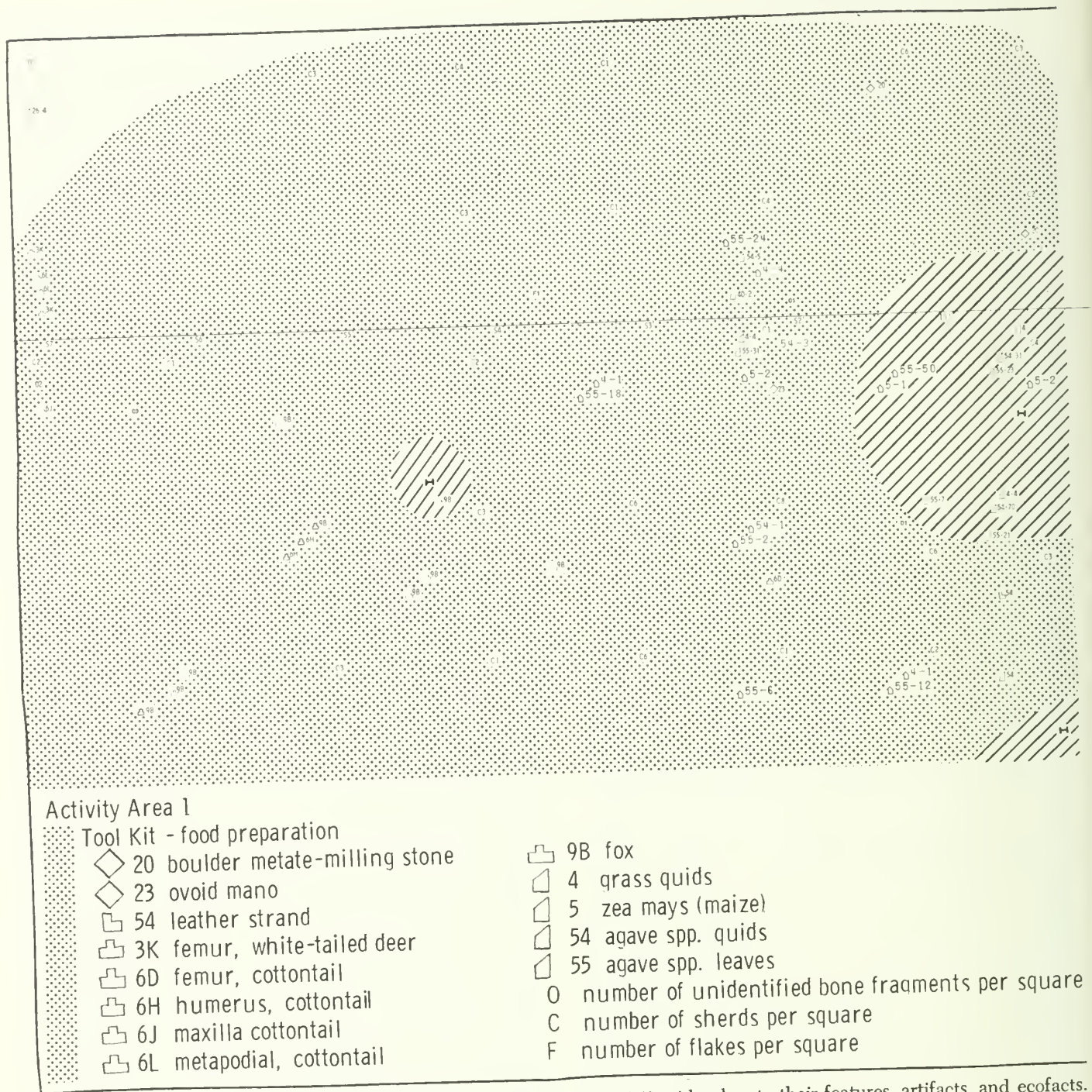
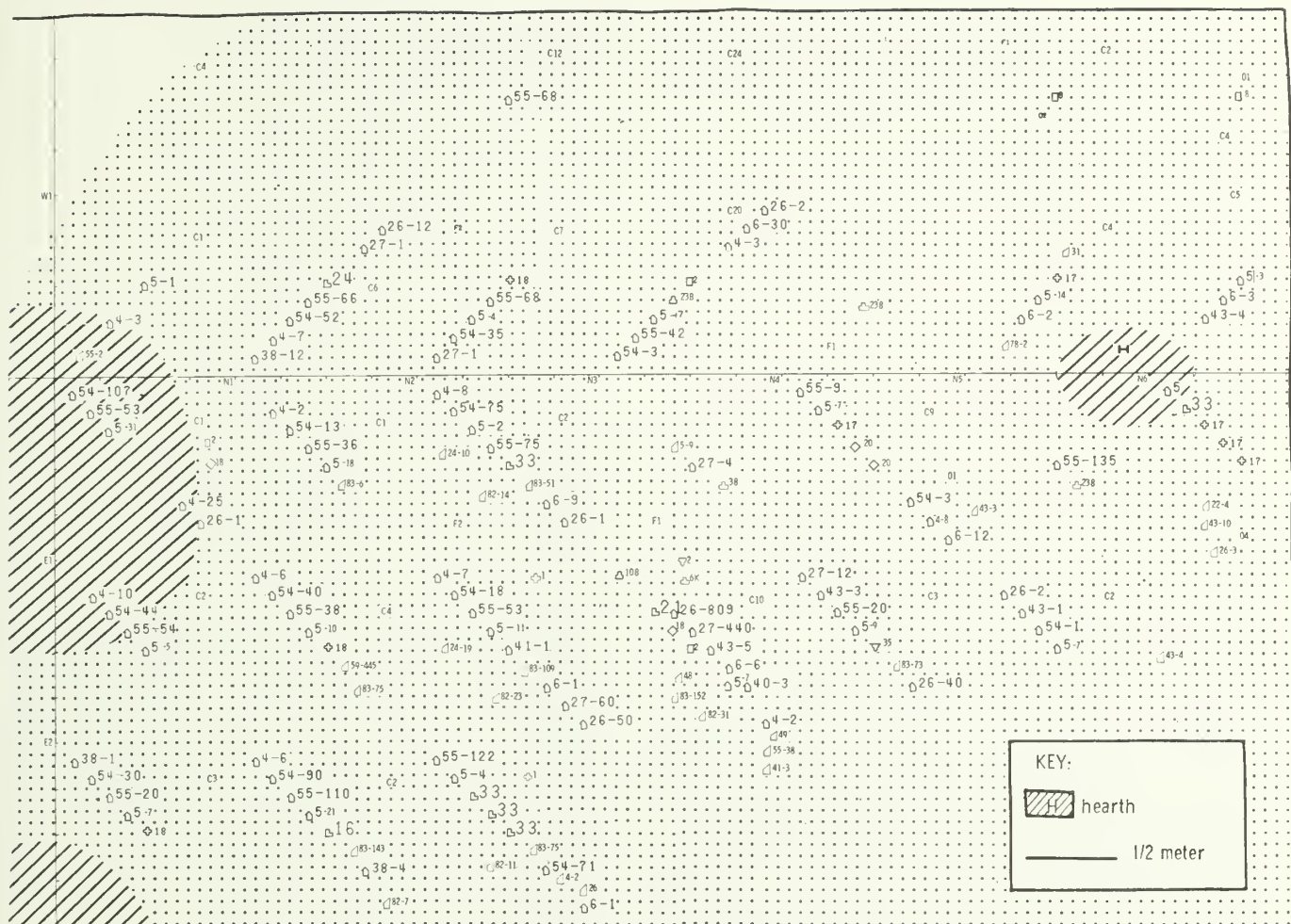


Fig. 46. The activity areas of Zone E of Tc 272 with a key to their features, artifacts, and ecofacts.



Activity Area 2

- Tool Kit - food preparation
- 18 muller or mano fragments
- 20 boulder metate-milling stone
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 22 casimiroa edulis (white bean)
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)
- 31 cephalocereus hoppenstedtii (tetecho)
- 38 opuntia spp. leaves
- 40 opuntia spp. fruit (prickly pear)

- 41 psidium guajava (ouava)
- 43 sideroxylon cf. tempisque (cosahuico)
- 48 unidentified cucurbita spp. (squashes and pumpkins)
- 49 c. mixta
- 3B other, white-tailed deer
- 6K scapula, cottontail
- 10B skunk
- 23B iguana
- 0 number of unidentified bone fragments per square
- C number of sherds per square

- Tool Kit - weaving
- 2 semi-basket weave
- 35 twilled basket
- 1 polished stick
- 18 pounded stick
- 16 slip knot
- 21 two half hitches
- 24 square knot
- 33 square knot
- 54 agave spp. quids
- 55 agave spp. leaves
- 59 yucca periculosa seeds
- 78 zizyphus pendunculatus (cholulol)

- Tool Kit - woodworking
- 2 fine blade fragments
- 8 fine blades
- 17 cut cane
- 24 jatropa neopauciflora
- 82 bark
- 83 wood
- F number of flakes per square

(Fig. 46 continued)

plants, but predominantly have fall fruits, chupandilla, ciruela, guava, cosahuico and white sapote, as well as iguana bones and corn of the wet season. Thus, we think a microband reoccupied the floor in the fall (see Fig. 46).

We found it difficult to determine the diet of the larger spring occupation because part of the food remains from the north end were mixed with the smaller fall occupation. However, one feces from S1E2 has predominantly *Lemaireocereus*, *Opuntia*, grass seed, and a little meat. The other feces from N2E1, also seems to be of the spring season. It has mesquite, *Setaria*, and grass seed predominating in addition to a little meat, corn and *Agave* (cf. Vol. 1 of this series, Chap. 14). This suggests a spring diet composed mainly of wild plant remains supplemented by some game they killed, and agricultural corn surplus produce stored from the previous wet season. Somewhat confirming this estimate are the food remains from the south Activity Area 1, which are predominantly *Agave* leaves and quids, grass quids, and some cobs of corn, as well as bones of deer, rabbit, and fox.

In fact, one gets a definite impression that the spring macroband occupation activities were concerned mainly with subsistence, that is, the collecting of wild seed and leaves, trapping and hunting, and then preparing this food, including corn out of storage, for consumption. The only artifacts uncovered in Activity Area 1 were an ovoid mano and metates. Its most prominent feature was the huge roasting pit, full of burned rock and charred *Agave* leaves and corn cobs. Perhaps the meat was also roasted in this pit or the smaller pit, for some of the bones were charred and the ceramic fragments were all from ollas that had no adhering carbon or evidence of burning or cooking.

The artifacts from Activity Area 2 suggest that the way of life of the microband occupation was very different from that of the south area and the direct association of these artifacts with fall plants suggests it was done in that season; although, of course, there is some possibility that some of these activities could have been done during the macroband spring occupation in the north area.

Certainly the diet of the fall microband occupation was very different for it is predominantly agricultural produce; that is, chupandilla, cosahuico, ciruela, saposotes and guava fruits (probably harvested from the orchards growing in the flats of the water of nearby Purron Dam) as well as corn and squashes. Some wild plant remains did occur, as well as bones of deer, rabbit, skunk, and iguana, but our liter estimates from Vol. 1 (Chap. 15) show about 68% of their food was

from agricultural produce, about 24% from wild plants, and 8% from animal remains.

Tools reflecting subsistence activities are not numerous. The basket, the loop made by a square knot, and the slip knot on an *Agave* strand could have been part of a trap to catch the small mammals. The deer, of course, was probably hunted.

Evidence of food preparation is somewhat better for we have mullers and milling stones indicating corn grinding. Also, charred bones, charred *Opuntia* leaves, charred corn cobs, and charred *Agave* leaves in the smaller pit at N5.9 indicate that roasting on hot rocks was still a favorite way of cooking and occurred in the spring season. Rather surprisingly, none of the sherds uncovered were recorded as having adhering carbon. They were probably not used as cooking receptacles. Thus, it would seem that the 7 ollas and 6 bowls were used for storage, decoration, or eating. Also, 3 of the 14 splinters of bone look to have been scraped for marrow.

Only 4 flint chips were uncovered along with the 5 obsidians so we have little evidence of any flint knapping. One of the metate-milling stones is made from volcanic tufa, probably brought into the cave during the time of Zone E. However, one milling stone could have been ground out from local boulders or pebbles during their stay. Woodworking might have occurred during the fall sojourn in Activity Area 2. We found 5 pieces of sawed *carrizo*, 2 polished flat sticks, and 3 pounded sticks with one of their ends whittled to a point. The blades and flakes could have been the implements used. They also could have been the tools used to cut and slice the *Agave* leaves for making the strands that were tied into slip loops, two half-hitches, a square knot, and a fisherman's knot. The piece of basketry and one-over-two cotton cloth are clues to weaving during the fall in Activity Area 2. The polished sticks could have been weaving tools and the pounded sticks, since one is polished on one side near the pounded portion, could have served as anchors for belt looms. The cloth itself suggests they were utilizing a back strap loom that had warps made of single-ply, Z-twisted cotton yarn made elsewhere by use of a spindle whorl. Then, woven through the warps in an over-one-under-one manner were wefts composed of two Z-twisted cotton yarns to form a semi-basket weave, one-over-two (Specimen 1) piece of cloth (cf. Vol. 2 of this series, pp. 221-222). Evidently the cloth had become worn, for one raw edge was turned under and hemmed with fairly crude and careless stitching.

Thus, in Zone E we have a sequence of occupations going from spring famine with *Agave* roasting, to fall

feasting with numerous activities being undertaken. The sherds suggest the occupations were of Early Palo Blanco times during the first few centuries after the time of Christ.

The Way of Life of Zone D

After Zone E ceased to be occupied, more yellowish-brown dust was blown into the cave from down the canyon. We say this because in the south end of the cave the deposit is only about 10 cm. thick, while in the north end it had built up to over 20 cm. It was then lived on for a few brief periods and a thin layer of ash was deposited on top of parts of the yellow loess. This ash occurred in the central portion of the cave from about S6 to N8 and covered about 50 square meters. The occupations seemed to have been very brief. There are little foodstuffs and artifactual debris, and only one not very well-defined (or used) hearth area at N3E2 (Fig. 47). The plant remains suggest to us that the cave was occupied on brief visits during two seasons. Grass quids, pochote pods, coyol fruits, and *Opuntia* leaves that occur from one end of the ash floor to the other (42 square meters) seem to indicate an early spring occupation by a microband, perhaps a group of men on a planting trip. The other casual occupation of only slightly smaller size (30 square meters) seems to have taken place during the harvest season in the fall (Sept.-Oct.) when the cosahuico, chupandilla, sapote, avocado fruits and other plants were ripe in the orchards near Purron Dam. These fall plants were concentrated in two areas (Areas 2 and 3) in the center of the cave. There is, of course, the possibility that this second occupation was really two brief visits rather than one. We say this because of the corn which usually ripens in August before the other fruits; however, with Purron Dam still functioning nearby, the corn could have ripened at the same time as the fruits.

Calculation of foodstuffs preserved on about 10 square meters of the 50 square meters of occupation revealed that the overall (both seasons) subsistence in liters was 72% from domesticated plants, 27% from wild plants, and 1% from a single rabbit killed. A more accurate estimate would be about 16% from agricultural produce (57 estimated liters of coyol) and 84% (29.6 estimated liters of wild plant foods) from wild plants for the spring occupation, and about 98% from agricultural produce and 2% from meat (the rabbit) for the fall occupation (see also Vol. 1 of this series, Chap. 15).

Archaeological evidence of subsistence activities is not numerous. However, the occurrence of soft fiber strands, with a slip knot in one end in the squares with

the broken rabbit tibia, and unbroken femur, does suggest trapping with a spring snare. Obviously, the harvesting of the domesticated fruits, corn, and wild plants needed little equipment other than strong fingers and wrists, or, at the most, some sort of cutting object with a sharp edge. Any of the foods could have been brought to the cave in the twilled basket. The many sticks without bark (396) and also partially scorched or burned (71), as well as the pieces of bark (27), might have been connected with the making and using of digging sticks for planting, but it is difficult to tell exactly.

There is little we can say about food preparation techniques, for much of the plant foodstuffs, such as fruits and leaves, could have been eaten raw. Both of the cylindrical bowls of El Riego Gray and El Riego Black had charring on their interior, however, suggesting that some food, such as corn and rabbit meat, could have been cooked in them. The short-neck ollas of Quachilco Mica and the spouted vessel of El Riego Plain may have served as storage vessels, while the rest of the vessels, 6 bowls of various types (1 Quachilco Brown everted-rim bowl, an outsloping and a hemispherical bowl of El Riego Gray, a bowl of El Riego Marble-tempered and 2 conical bowls of Thin Orange), might have been used to eat from.

Evidence of their other activities is difficult to discern. The sticks and the cut cane do suggest woodworking, and the 4 chips, 2 side-scrappers and the fine blade may have been the tools of the trade. Since much of the wood, cut wood, and one side-scraper occur in Activity Area 3, this is where it may have been done. The large nicks on both edges of one of these side-scrappers do suggest it was used to whittle against something hard.

The many *Agave* quids and the corn and *Agave* leaves, some of which (about 100) have been sliced longitudinally, the twilled basket of *Agave* or palm leaf strands, and the sandal of *Agave* strings and the checker-woven petate of corn leaves, suggest weaving activities during their brief fall sojourn. Also, the slip-knot snare made from bast fibers of well-chewed bark or *Agave* leaves could have been manufactured in the cave. Weaving may have occurred during the fall occupation in both Areas 2 and 3.

The sherds suggest an Early Palo Blanco occupation during the first few centuries of the Christian era.

The Way of Life of Zone C

Over Zone D is a thin (10-cm.) layer of brown soil, some of which was blown into the cave and some of which was the result of the disintegration of the cave

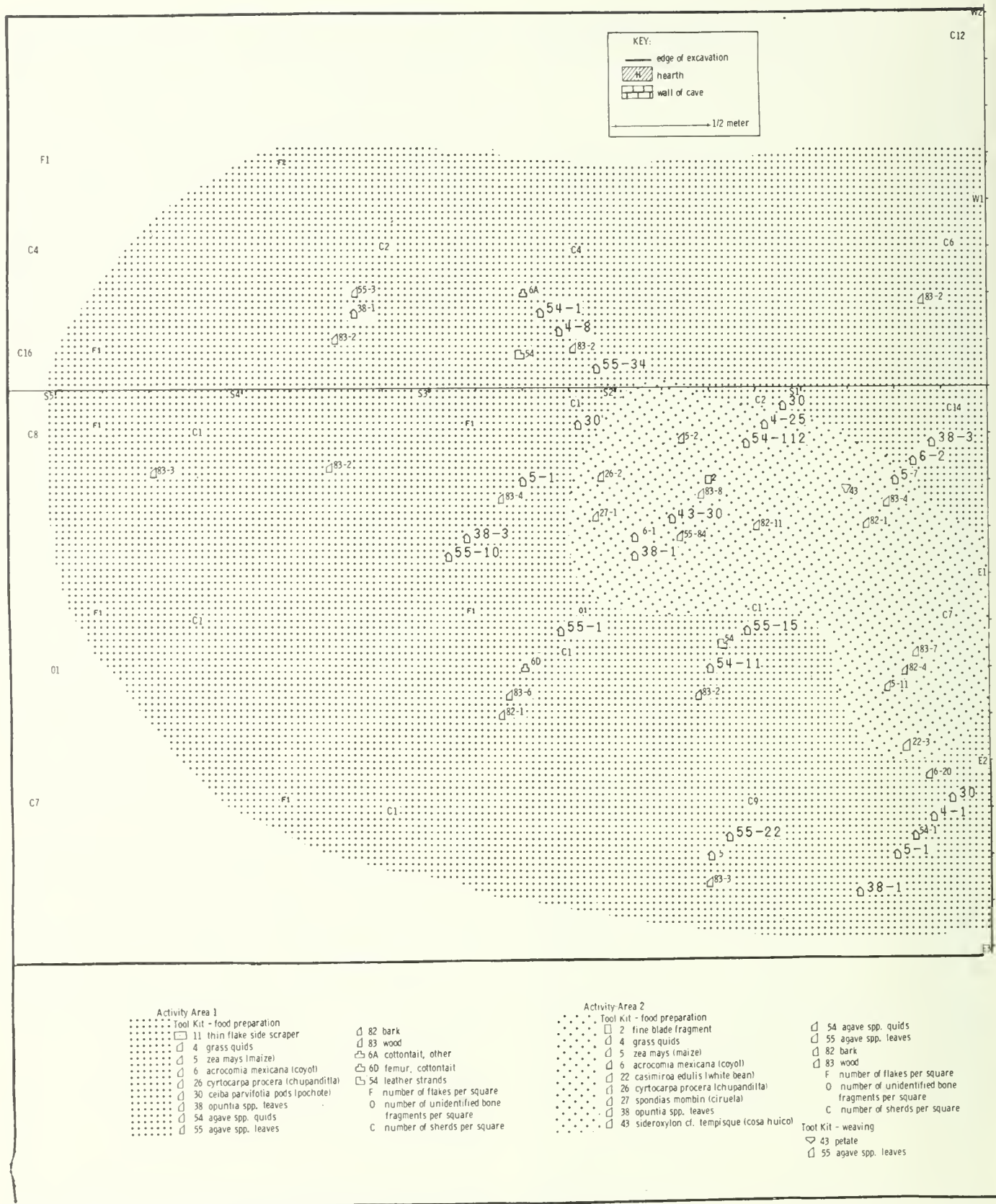
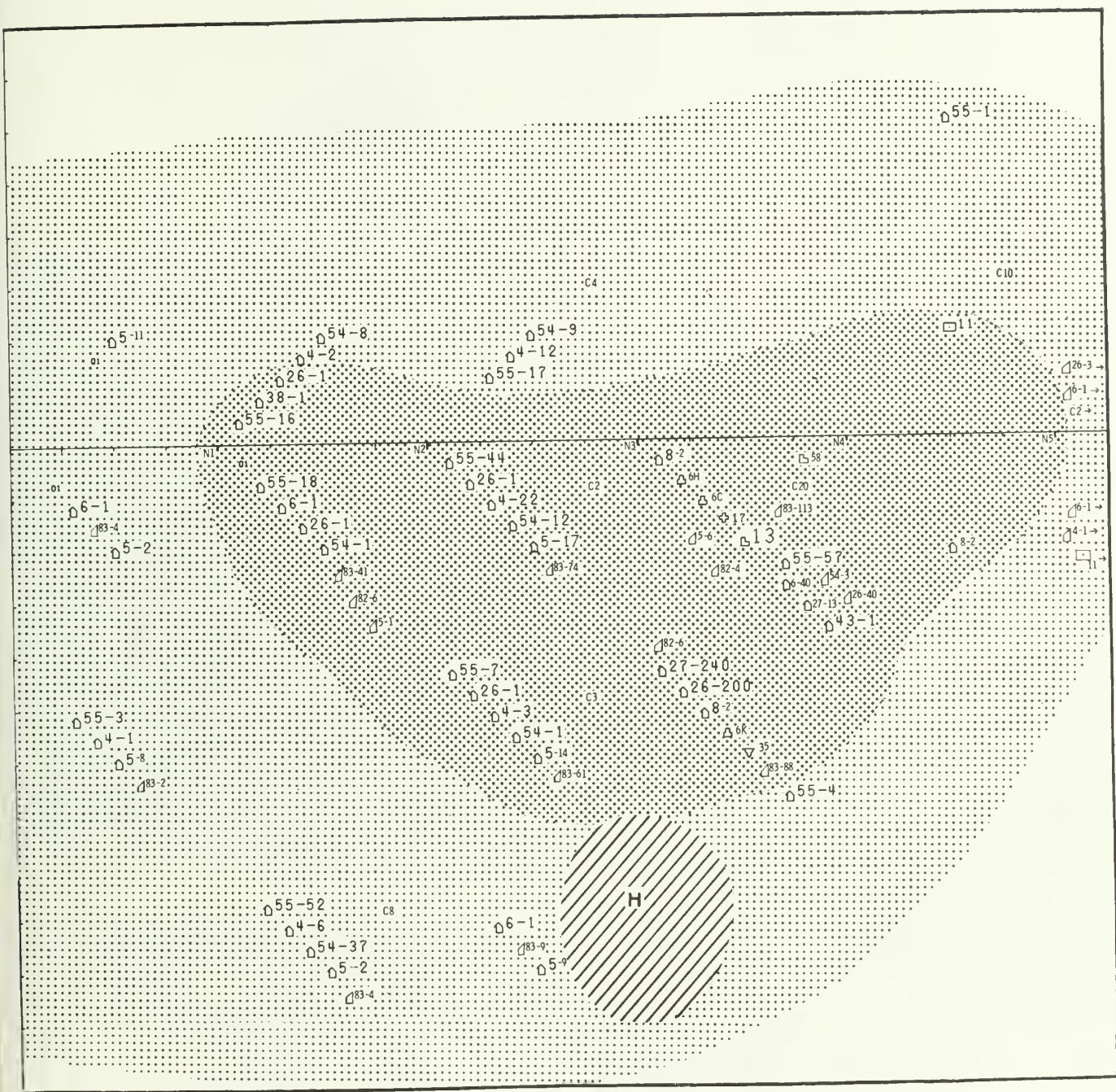


Fig. 47. The activity areas of Zone D of Tc 272 with a key to their ecofacts, artifacts, and hearth.



Activity Area 3

Tool Kit - food preparation

- 11 thin flake side scraper
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 8 persea americana (avocado)
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)
- 38 opuntia spp. leaves
- 43 sideroxylon cf. tempisque (cosahuico)

- 54 agave spp. quids
- 6K scapula, cottontail
- 6H humerus, cottontail
- 6C tibia, cottontail
- O number of unidentified bone fragments per square
- F number of flakes per square
- C number of sherds per square

Tool Kit - wood working

- 11 thin flake side scraper
- 17 cut cane
- 83 wood
- F number of flakes per square

Tool Kit - weaving

- 13 slip knot
- 58 sandal
- 35 twilled basket
- 55 agave spp. leaves
- 82 bark

(Fig. 47 continued)

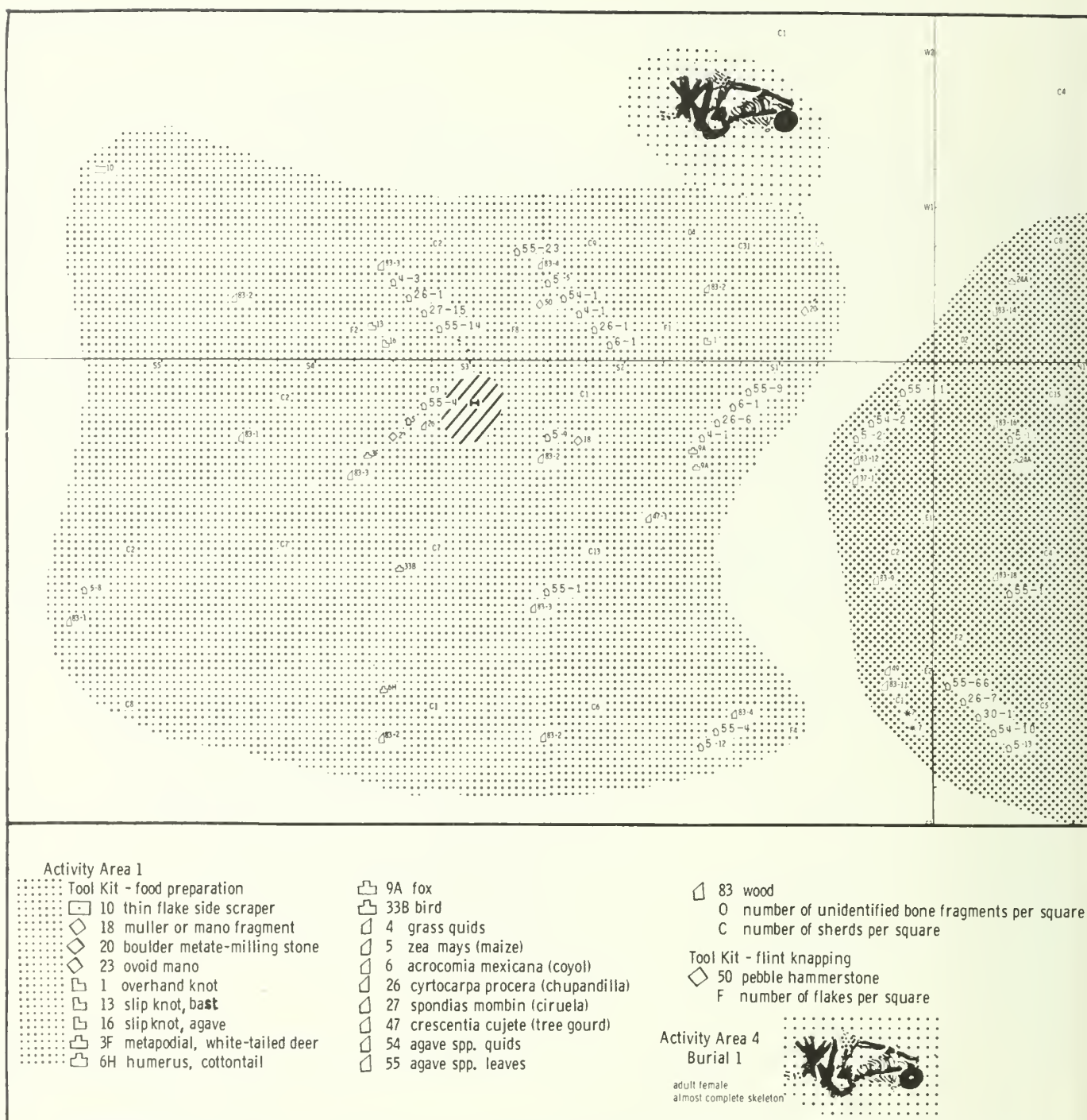


Fig. 48. The activity areas of Zone C of Tc 272 with a key to their features, artifacts, ecofacts, and Burial 1.



Fig. 49. Burial No. 1 of Tc 272 in Square S1W1 of Zone C, as seen from the west.

rock, falling onto the floor. The zone is capped by a fairly heavy layer of charcoal from about N2 to N8. A hearth about 10 cm. deep and 50 cm. in diameter is centered at about N6W1 north of the charcoal covered area. Around the northern hearth a concentration of artifacts and ecofacts from about N5 to N8 is our basis for Activity Area 3. Also, in this northern charcoal-covered part of the cave was a second concentration of artifacts and objects from about S.5 to N5, Activity Area 2. South of it and clustering around a small southern hearth at S3 was a third concentration of ecofacts and artifacts which we have called Activity Area 1 (Fig. 48). In each one of these activity areas are roughly the same kinds of plants that ripened in the period approximately from late spring (grass quids, *Leucaena*, and pochote) to early fall (ciruela, chupandilla, etc.). We have interpreted this as indicating that it was a macroband group which visited the cave, perhaps intermittently, from spring through the fall. In other words, Zone C was a sort of base of agricultural operations, a home away from a permanent home or homes in the nearby towns or villages.

The total plant and animal remains reveal that about 71% of the diet came from agricultural plants and fruits, 25% from meat, and 4% from wild plants (see also Vol. 1 of this series, Chap. 15). These estimates were for all seasons; probably in the spring there was a slightly greater emphasis on a meat and wild plant diet which, in later seasons, would be replaced by more of their domesticated plant foods. Of the two feces uncovered (see Vol. 1 of this series, Chap. 14), one (No. 61) showed *Lemaireocereus* seeds and meat and a little ceiba root and *Setaria*; the other (No. 64) had

mainly meat with some chili and a wild legume. Both seem to have come from the earlier spring occupation. Domesticated plants harvested included corn, chili pepper, *crescentia* and mixta squash, and coyol, ciruela, and chupandilla fruits. It might be noted that the plants that had to have a steady water supply, such as sapotes and avocado, are absent, so we believe that Purron Dam was no longer in use. Wild plants collected included pochote pods, guaje pods, *Opuntia*, *Setaria*, grass and *Agave* (quids), as well as various remains of cactus. Implements connected with these subsistence activities were, in the main, lacking; however, some of the burned sticks (17) could have been planting sticks. The flake side-scraper in Area 1 could have been used in cutting these foods' remains as could the flakes, and they could have been carried into the cave in the coiled split-stitch basket or in the carrying loops of maguey, tied together by overhand or slip knots, or in carrying loops of softer fiber held together with slip knots or granny knots in Areas 1 and 3. The maguey fiber with a slip knot might have been part of a snare used in trapping the fox or rabbit. How the bird and iguana were caught is unknown; we assume the deer was hunted, but we have no evidence of their hunting techniques.

The ovoid mano in Area 1, the mano or muller fragments, and 2 of the 3 metate-milling stones with straight scratches from all areas may have been used to grind up the corn or squash seeds into fine flour, while the hammerstone and the metate-milling stone with curved scratches may have been used to grind up the chili, grass, *Setaria*, or cactus seeds. Some of the latter seeds in the feces show evidence of milling by a circular motion. The pebble hammerstone might also have been used to mash up some of their foods. The El Riego Orange and Black bowls with incised bottoms may have been molcajetes in which this food was prepared. The side-scraper as well as the flint flakes could have been used to butcher and cut up the meat; the small number of bones of each of the four animals identified indicates that most of the butchering was done elsewhere and the meat, with a few adhering bones, brought back to the cave. All the bones of the deer and fox had been charred, and so perhaps were roasted, but there were no fire-cracked rocks in the so-called hearths; so, apparently the meat was roasted on live coals rather than on hot rocks. Most of the sherds of Quachilco Mica and Coxcatlan Brushed, as well as the cylindrical-neck olla of El Riego Polished, were heavily burned, indicating that some food was cooked in ollas. The two or more vessels of El Riego Marble-tempered also had burned exterior bottoms,

showing that some of the ground (corn?) flour may have been baked into tortillas. The unburned sherd of El Riego Plain and the short-neck olla of El Riego Black may have served for storage. The possible bowl of Quachilco Gray, the 3 outflaring-rim bowls, the hemispherical bowl, the cylindrical bowls and the basal-ridge bowls of El Riego Gray, the outflaring-rim bowl of Quachilco Brown, the two conical bowls of Thin Orange, the three hemispherical bowls of El Riego Black, the hemispherical and incurved-rim bowls of El Riego Polished, all may have been used for storage, serving, or eating dishes or bowls. (See also Vol. 3 of this series, Tables.)

Evidence of other activities was not numerous, but the ovoid mano, the muller-mano, the 3 milling stone-metates, the abrader saw, the celt, and polishing pebble could have been ground into shape during their visits to the cave. The celt, the abrader saw, the log cut in beaver fashion, the many pieces of wood and bark in Area 2, may be cited as evidence of woodworking. Another major activity may have been connected with textiles seemingly in Area 3. The *Agave* leaves (about half of which had been split) may have been brought into the cave for making string or strands. We did find 2 *Agave* strands, one with an overhand knot and another a slip knot, as well as bundle foundation baskets stitched together with *Agave* strands associated with the leaves. Some of the *Agave* leaves had been chewed not just for food but also to break down the leaves into soft fibers which could be twisted into string. One yarn of the softened fiber in N6E1 had been S-twisted into a yarn, held with a granny knot; and two pieces of Z-twisted cord composed of two S-twisted *Agave* yarns were found in Square E3 in direct association with the majority (25 out of 30) of the *Agave* quids in Squares N1E3, N2E3, and N3E3. The conical split-stitch bundle-foundation basket (N6E2) may also have been manufactured by these inhabitants of Purrón Cave, for we found quantities of maguey fibers for the stitching, as well as grass and grass quids for the bundle foundation, close to the basket fragment. We also found, according to the field notes, at least 3 bundles of cotton fibers as well as a piece of two-ply cotton cord made of two S-twisted cotton yarns. We believe this S-twisted cotton yarn was hand-twisted rather than spindle whorl-twisted. Pochote pods with their cotton bundles and a string of pochote or istle fibers tied into a slip knot also occurred. We found a fragment of a blanket or a gunnysack-like bag made of similar fibers. The yarns of the cloth were S-twisted by hand and the textile (Specimen 4) had been loosely woven into a plain over-one-under-one weave on a

belt loom with 19 warps by 18 wefts per 2.5 cm. (see also Vol. 2 of this series, p. 219). The textile had been well used during their stay as the edges were frayed and several holes had been worn through it.

The 3 cores and chips and hammerstone in Area 1 also indicate they did some flint knapping, evidently in this same area. One other activity happened during this occupation, very shortly after the main visits. We say "shortly after" the occupation, for the pit of Burial 1 was dug from the top of the ash layer and through it, rather than down from it. This final activity in Activity Area 4 was the burying of a young adult female, flexed on her right side with her head north in a shallow pit (about 30 cm. deep) 1 meter long by .5 meter wide in Square S1W1. Except for a pebble and some carbon, there was no evidence of burial goods or of any special rites (see also Vol. 1 of this series, Chap. 6) (Fig. 49).

On the basis of the frequencies of the types of sherds found in Zone C, we classified it as a component of Palo Blanco in about the middle of this time period, that is, from roughly 100 to 300 A.D.

The Way of Life of Zone B

Zone B, about 10 cm. above the surface of Zone C, was composed mainly of disintegrated cave rock or aeolian soils impregnated by ash. In two portions of the cave, one from N2 to N7 and the other between S1 and S3, was a well-defined charcoal floor capping the zone, as well as two concentrations of artifacts and ecofacts that roughly correlate with the two areas. These are referred to as Activity Area 1, roughly from S6 to N1 and containing two small hearth areas within it, and Activity Area 2 from N2 to N6 with 2 more small burned fireplaces like Area 1. Like the previous floors, remains of spring and fall plants occurred in both areas, indicating possible intermittent microband occupations throughout these seasons. Again one would suspect that these occupations were brief visits away from their more permanent homes for the purpose of planting or harvesting (see Fig. 50).

As in the previous floors, it was difficult to estimate the sustenance during each of these brief seasonal stays; examination of the refuse on the floor, however, can give an overall picture of their diet. About 80% of their diet seems to have come from agricultural produce (mainly corn; slender pop and Chapalote-Nal-Tel complex), 18% from wild plant remains (mainly pochote roots, pods, *Opuntia*, other cactus and *Agave*), and only about 2% from meat (cf. Vol. 1 of this series, Chap. 15). This is a rather different picture from that which we get from the few feces (Nos. 55-58 and 68),

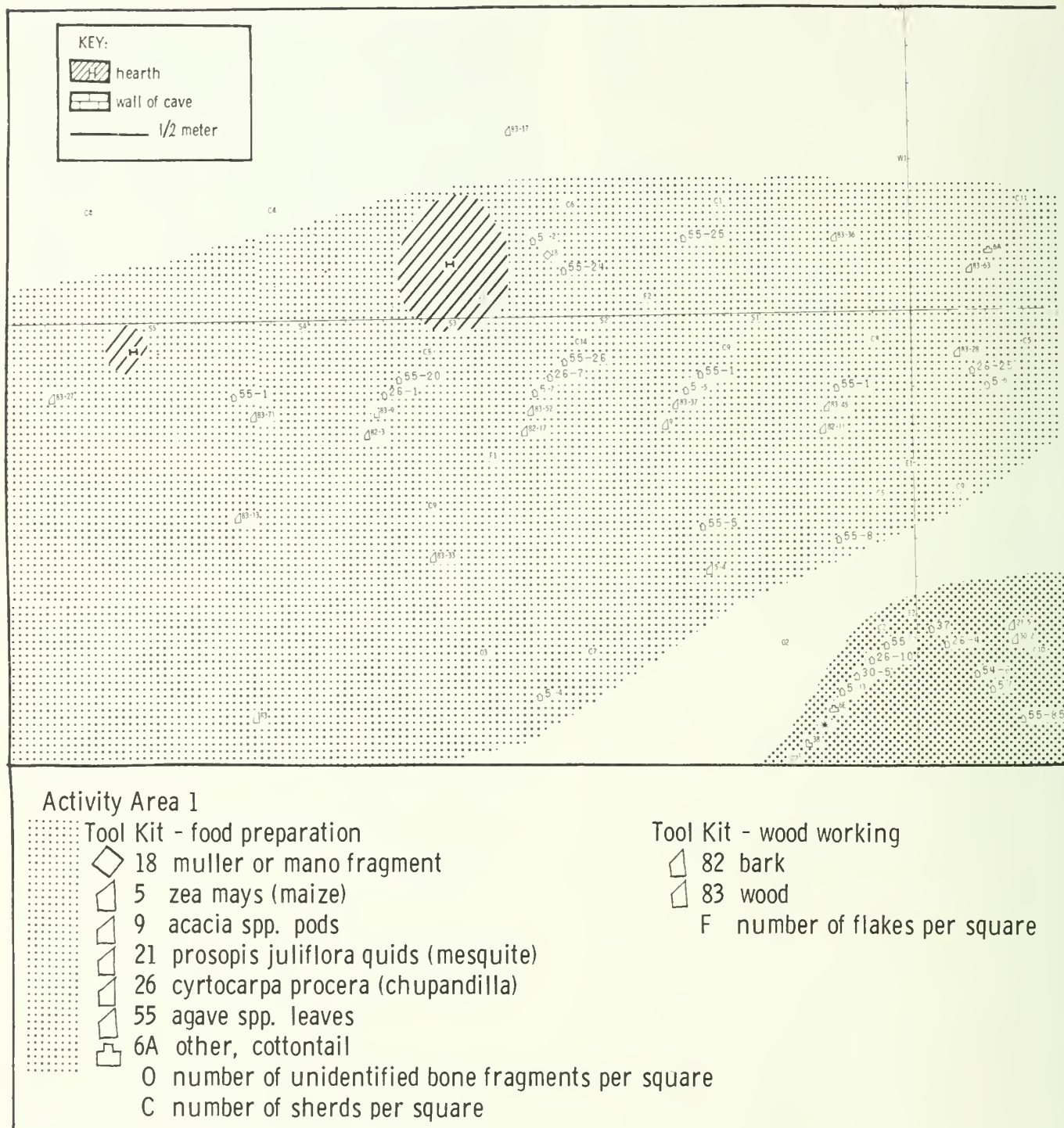


Fig. 50. The activity areas of Zone B of Tc 272 with a key to their hearth, artifacts, and ecofacts.

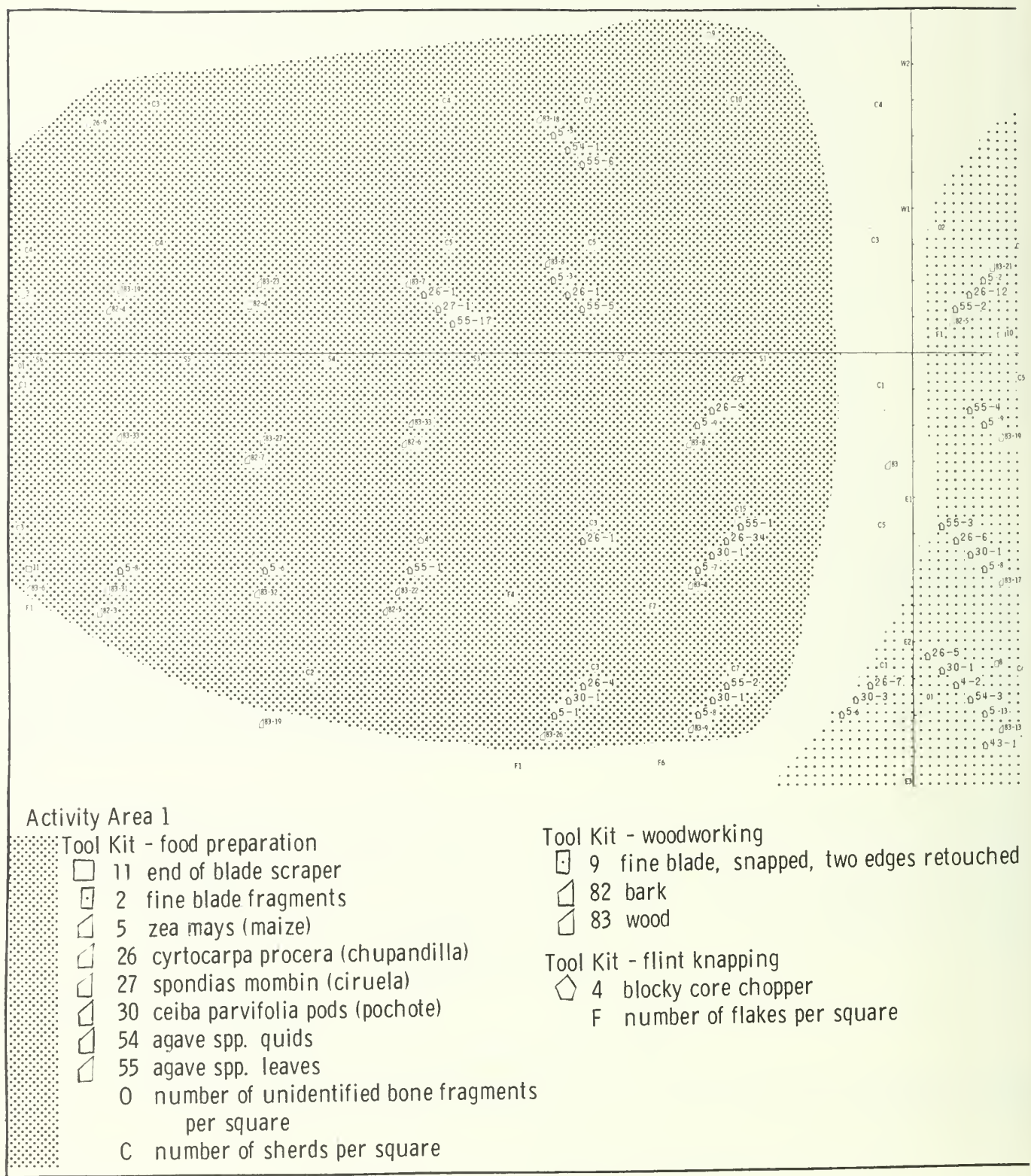
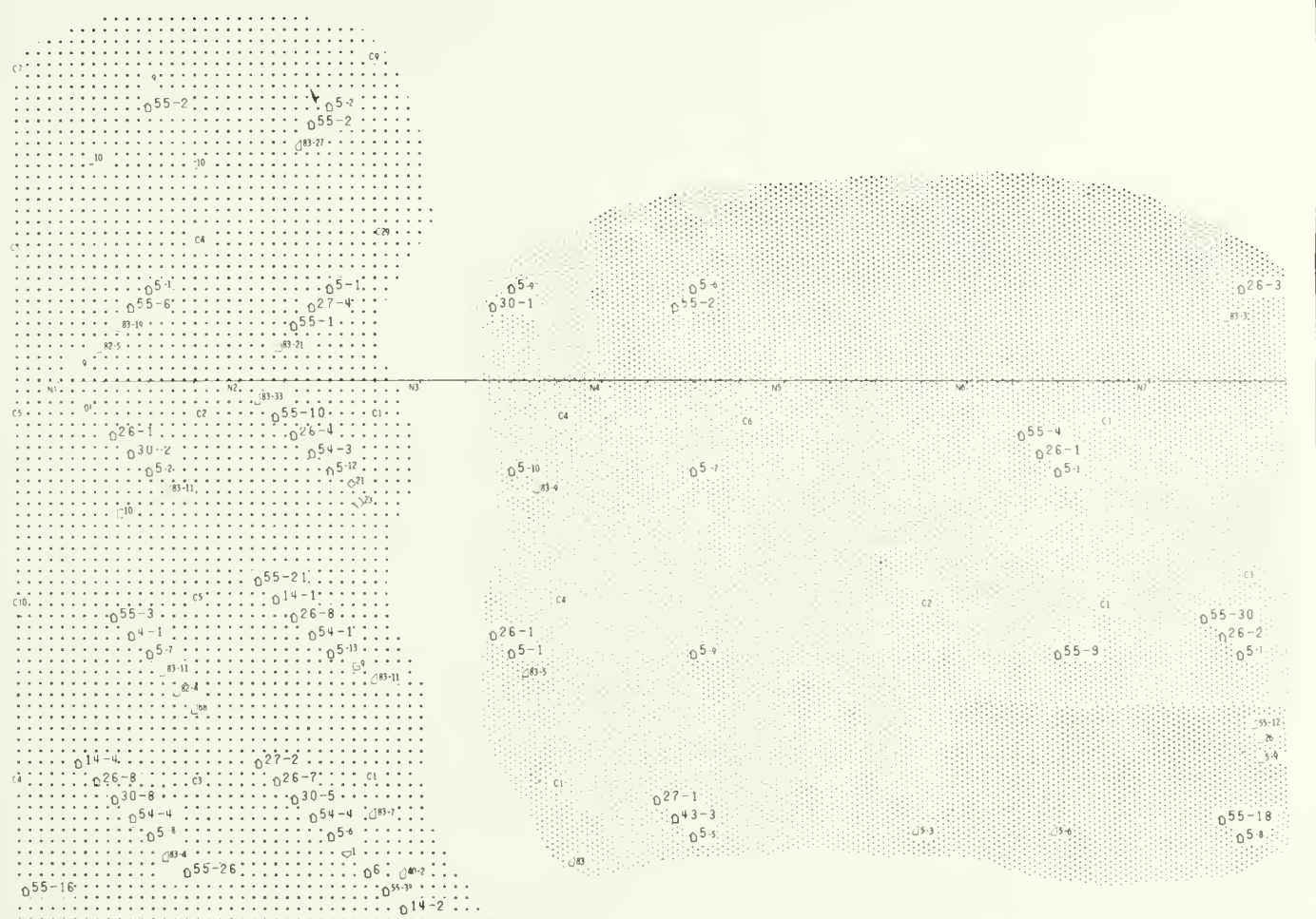


Fig. 51. The activity areas of Zone A of Tc 272 with a key to their ecofacts and artifacts.



Activity Area 2

- Tool Kit - food preparation
- 23 ovoid mano
- 8 fine blade, pointed platform
- 10 fine blade, ground platform
- 10 thin flake side scraper
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 14 leucaena esculenta
- 27 spondias mombin (ciruela)
- 26 cyrtocarpa procera (chupandilla)
- 30 ceiba parvifolia pods (pochote)
- 40 opuntia spp. fruit (prickly pear)
- 43 sideroxylon cf. tempisque (cosahuico)
- 54 agave spp. quids
- 55 agave spp. leaves
- 0 number of unidentified bone fragments per square
- C number of sherds per square

Tool Kit - woodworking

- 9 fine blade, snapped, two edges retouched
- 10 thin flake side scraper
- 82 bark
- 83 wood
- F number of flakes per square

Tool Kit - weaving

- 21 threaded needle
- 9 overhand knot
- 1 plain weave cloth
- 68 gossypium hirsutum (cotton)

Activity Area 3

Refuse disposal

- 5 zea mays (maize)
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)
- 30 ceiba parvifolia pods (pochote)
- 43 sideroxylon cf. tempisque (cosahuico)
- 55 agave spp. leaves
- 83 wood
- C number of sherds per square

(Fig. 51 continued)

which show *Agave* dominant in one (No. 57), *Agave* co-dominant with meat in another (No. 68), and cactus co-dominant with meat in another (No. 55); meat is co-dominant with chili pepper (No. 58), and meat with *Opuntia* (No. 56), in two feces, respectively, while *Lemaireocereus* and *Setaria* seeds appear in some specimens (cf. Vol. 1 of this series, Chap. 14). This contradiction revealed by the garbage predominating in domesticates and the feces predominating in meat and *Agave* is, however, more apparent than real, for about 70% of their garbage food was corn. Evidence of corn would not appear in the feces because, on the basis of the cut glumes, grinding stones, and comales, corn seems to have been finely ground.

While evidence of their diet is not overwhelming, it is far greater than the direct evidence for subsistence activities. However, it does seem likely that one rabbit was trapped, the corn planted and harvested, the various *Agave* leaves, pochote pods, fruits, and mesquite pods, were plucked, seeds gathered, and pochote roots dug up. Evidence concerning their food preparation activities is somewhat better. All the corn cobs had had their glumes cut (by one of the 6 flint flakes) indicating how the kernels were shucked. Apparently, the kernels were then finely ground by the ovoid mano or muller-mano fragment (with straight scratches) in the metate-milling stone which has similar wear markings. Next, the flour may have been soaked in limey water, perhaps in the El Riego Black short-neck olla which had lime concretions in its interior, and then patted into tortillas and cooked on the comal of El Riego Marble-tempered. The particles of chili found in the feces also may have been originally ground in the molcajete (interior decorated sherds) of El Riego Black. The fire-cracked rocks in association with the two small rabbit bones, both showing charred portions, suggest that the rabbit meat was roasted. The relative lack of other rabbit bones indicates it was butchered outside the cave. Some *Agave* leaves, as well as the pochote (jicama) roots, also show evidence of roasting. Much of the other food such as corn quids, *Agave* quids, mesquite quids, the cactus fragments, and the chupandilla, cosahuico, and ciruela fruits seem to have been eaten raw. No sherds showed evidence of being used for cooking. We would judge that the possible ollas of Quachilco Mica and El Riego Orange, the El Riego Black and Coxcatlan Brushed short-flaring-neck ollas, the El Riego Polished convergent-neck olla, and the El Riego Plain short-flaring-neck olla were utilized for storage; the conical bowl of Thin Orange, the cylindrical bowls of El Riego Black and El Riego Gray, and the hemispherical and flaring-wall bowls of

El Riego Gray must have been used as eating bowls or dishes (see also Vol. 3 of this series, Tables).

While many pieces of bark and the majority of the pieces of wood point to woodworking in Activity Area 1, the only extensive evidence is of textile-making or weaving in the north Activity Area 2 (see also Vol. 2 of this series, Chaps. 12, 13). The many *Agave* leaves and quids, the yucca leaf, the pochote fibers and the two bundles of cotton fibers may have been part of the raw material for making yarn, string, and cord. Made from the *Agave* was a strand tied into a loop by a granny knot, two pieces of Z-twisted cord of two twisted yarns of *Agave* fibers, and the S- and Z-twisted various yarns and cords used in a sandal. One piece of Z-twisted cord was composed of two S-twisted yarns of bast fibers, probably istle or pochote cotton. All of the above was hand-twisted or hand-rolled, but this is not true of the cotton used in the four textiles. Both the two basket-weave blankets had hard-spun, Z-twisted cotton yarn single-ply elements that seem to have been made by use of a spindle whorl. The plain weave is composed of single-ply, S-twisted, medium hard-spun cotton yarn. Whether this is spindle whorl spun or not is open to question. One of the pieces of plain weave is so small that one can say little more than that it seems to have been made on some sort of a loom, while the other was definitely made on a belt loom with single closely-spaced warps, about 52 per 2.5 cm., which had a single red-painted weft woven through it, over-one-under-one, etc. The other two specimens were, also, made on closely-spaced belt loom, but the weft elements were double yarns, thereby making pieces of semi-basket weave pieces of cloth. The lack of wooden weaving tools suggests these were not necessarily made in the cave, while the hard string and yarns may have been made during this occupation.

The sherds from the layer suggest a middle Palo Blanco classification for the occupation and indicate that it occurred during the first five centuries of the Christian era.

The Way of Life of Zone A

Zone A is the top zone of the cave and consisted of rock fall and dust that overlay vegetal materials that were on top of the charcoal floor of Zone B. Whether it represents a single occupation or not is open to question, for it had no true floor nor fireplaces. Artifact concentrations occurred for the most part between the 0 profile and N3, Activity Area 2; there was less concentration to the south, Activity Area 1, and only a few artifacts to the north, Area 3 (Fig. 51). The oc-

currence of spring and fall plants in each of these areas, however, does suggest that it may have been a single occupation by a microband. In fact, it bore many resemblances to the two underlying occupations in Zones C and B.

As was true for Zones C and B, it was difficult to estimate the subsistence of the occupants. Again, the many corn cobs suggest that the inhabitants were basically agriculturists. The few wild plants' remains and rabbit bones indicate a little trapping and plant collecting.

Evidence of food preparation is equally poor. However, a mano found in Activity Area 2 suggested seed grinding. Further, most of the glumes of the corn were cut. This fact and a piece of a comal of El Riego Marble-tempered are hints that tortillas were being made. Some food was boiled, as indicated by carbon adhering to the interiors of a cylindrical pot and a flaring-rim bowl of El Riego Gray. Also, a bowl sherd of El Riego Black had interior incisions. It might have been a molcajete used for grinding up chili or other food.

Most of the sherds, however, seem to be of storage vessels. There were rim sherds of at least 2 ollas of Quachilco Mica, an olla of El Riego Orange, an olla of El Riego Polished and at least 2 ollas of El Riego Plain. Sherds of a hemispherical bowl of El Riego Plain and ring-based conical bowl of Thin Orange, as well as trade sherds of bowls, could have been from eating dishes or vessels used as decoration.

Evidence of other activities was difficult to discern. No artifacts occurred in Activity Area 3, and, although subsistence activities may have occurred there, we classified it as a refuse area. In Activity Area 1, a blocky core (chopper) and a few chips suggest possible flint knapping; there were also many fragments of bark and wood of a possible woodworking industry. Perhaps the blades and end-scraper were the tools of this trade, although, of course, they could have been associated with subsistence or food preparation activities. There was also a large number of fragments of wood in Activity Area 2, and similar tools, as well as a side-scraper, that could have pertained to this activity. However, the most distinctive aspects of Area 2 are its needle and thread, overhand knot of bark cloth, piece of one-over-one cotton cloth, and cotton fibers. Perhaps here some weaving or sewing took place.

All in all, reconstruction of the activities of Zone A is not very satisfactory, nor is the chronological position exact. The potsherds, however, indicate that the visits probably occurred during Palo Blanco times,

roughly during the middle of the first millennium after the birth of Christ.

And so, having thus described the stratigraphy of Purron Cave, as well as having bravely attempted our reconstructions of the cultural activities that took place, we turn to our interpretation of the excavation of the other cave in this ecological niche, Abejas Cave. As will be seen, Tc 307 yielded information that in many ways was very different from that found in Purron Cave, and supplemented our knowledge of the prehistoric cultural activities of the locality.

Abejas Cave

Abejas Cave is situated in the same ecological niche as Purron Cave and in the same stratum, albeit on the opposite side of the peninsula-like cliff, but there are a number of environmental factors that must have made for very different aspects of living. First, Tc 307 faces the wide Abejas Canyon only about 300 meters north of its junction with the main Lencho Diego Arroyo. Thus, from the cave, one not only has a wide view of the Abejas Arroyo, but can also see much of the valley of Lencho Diego and the hills and mountains to the east of it. It is, therefore, an excellent game lookout, unlike Purron Cave with its limited view of the box canyon. Secondly, below the talus in front of Abejas Cave, about 3 meters above the arroyo, there is a long wide terrace, with grass that could be collected in the spring and where man could hunt and trap with relative ease. Further, when water was available, the terrace could have been farmed. The vegetation is also slightly different in the Abejas Canyon in a quantitative if not a qualitative way. While the vegetation on the talus of Abejas Cave is almost identical to that of the talus of Purron Cave, the growth on the terrace in front of Abejas Cave is quite different from anything in Purron Canyon. On these terraces, patches of grass can be seen among the many low thorny mesquite and pochote trees interspersed with only a few clumps of organ cactus, *Opuntia*, *Agave*, or lechugilla plants.

Abejas Cave not only is smaller than Purron Cave but also offers less shelter from any of the summer rainstorms. It is relatively narrow, less than 4 meters, and only about 10 to 15 meters long. It had a relatively level floor, free of rock fall, of about 4 by 6 meters, that falls away to a steep talus slope. The floor of the cave is about 3 meters above the terrace and to the east of it.

Initially, we dug a 1-meter test square at E3 to a depth of 2 meters. Then, using a horizontal stripping

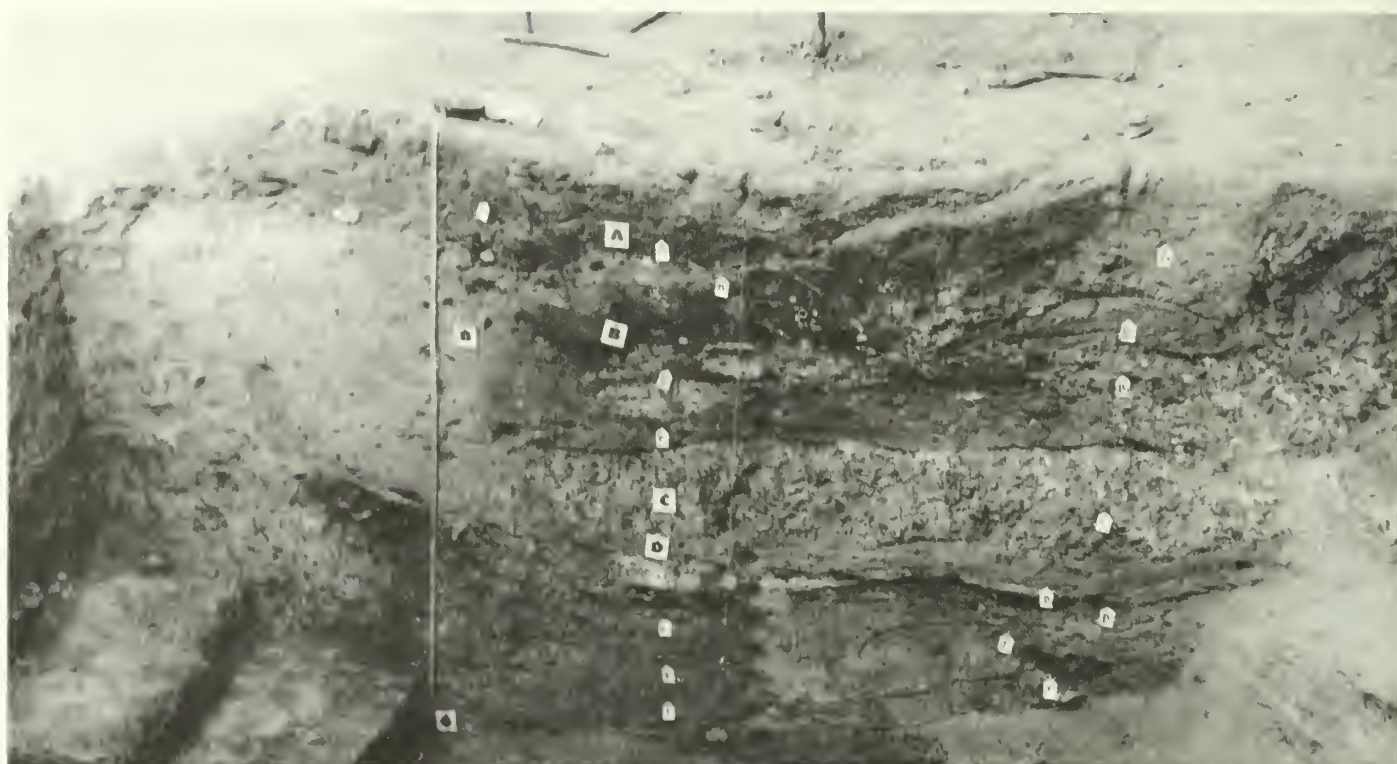


Fig. 52. The east-west 0 profile of Tc 307.

technique of zones, from a vertical face, we dug Squares E2, E1, and 0-0 at the back of the shelter. We then named the zones in the 4-meter-long, 2-meter-deep profiles and photographed and drew them. We then moved southward into Squares S1E3 and S1E1 and then into the alternate squares, giving a long profile at S1 by our horizontal stripping technique from a horizontal face. This system continued until the S3 profile was reached at a slightly deeper level and then two squares, N1E2 and N1E1, were dug in the north.

From this technique we were able to determine the stratigraphy; further study allowed us to reconstruct the cultural activities of each occupation on each zone. The cave was so small and artifacts so few in number and in no concentrations, that we did not attempt to plot each floor as we did with Purron Cave. Subsistence, artifacts, and pottery may be checked in Vols. 1, 2, and 3 of this series. Table 4 outlines the sequence in Abejas Cave.

The Way of Life of Zone H

Zone H covered only about 4 square meters, mainly in Squares S1E3, S2E3, and S3E3. The zone blended

T A B L E 4
Sequence in Abejas Cave (Tc 307)

Occupation 10	<i>Palo Blanco Phase</i> Zone A	0-500 A.D.
Occupation 9	<i>Abejas Phase</i> Zone B	3200-2600 B.C.
Occupation 8 (?)	Zone C	3400-2800 B.C.
Occupation 7	<i>Coxcatlan Phase</i> Zone D	5000-4400 B.C.
Occupation 6	<i>El Riego Phase</i> Zone D ¹	5900-5500 B.C.
Occupation 5	Zone D ²	6100-5700 B.C.
Occupation 4	Zone E	6150-5750 B.C.
Occupation 3	Zone F	6200-5700 B.C.
Occupation 2	Zone G	6300-5800 B.C.
Occupation 1	Zone H	6800-6100 B.C.

into the rock floor or rock fall just east of the S2 axis, but thickened to about 30 cm. at the edge of the talus at the S3 axis. The stratum was dark gray in color and composed mainly of fine scale-like rocks that eroded from the roof and back wall of the cave, which had

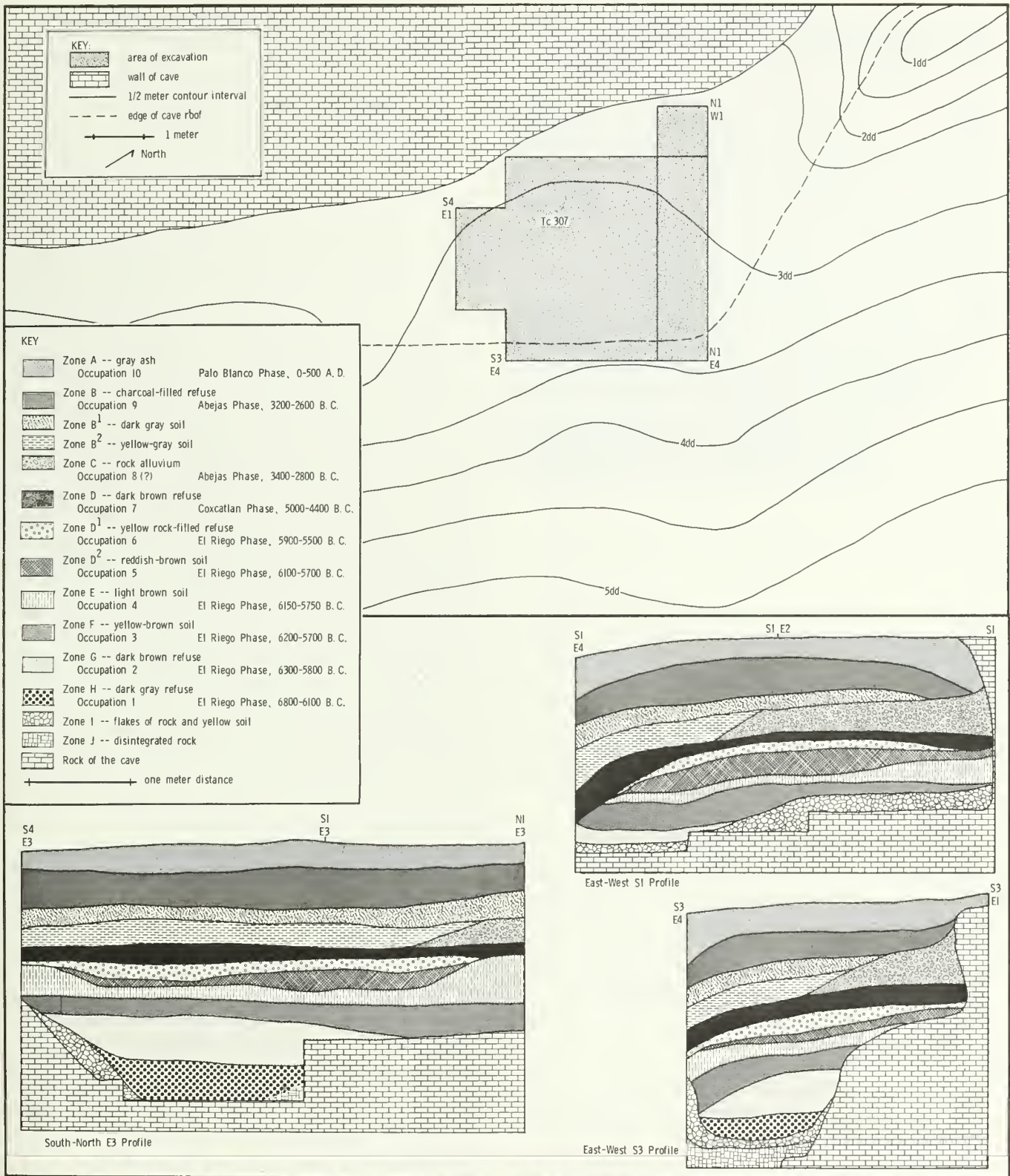


Fig. 53. Contour map of Abejas Cave and (below) the south-north E3 profile (left) and east-west S1 and S3 profiles (right).

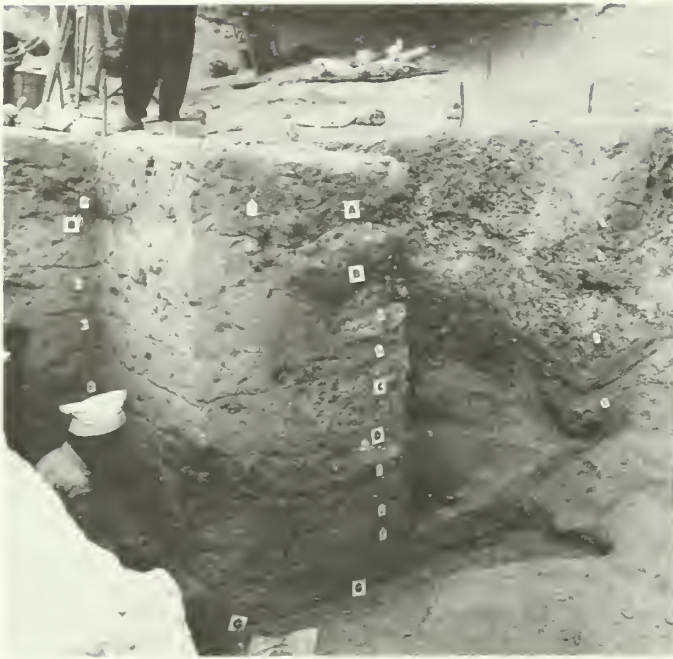


Fig. 54. Excavation in Square S3E3 of Abejas Cave showing stratigraphy of S3E2 as viewed from the northeast.

become darkened by refuse charcoal and ash from human occupation. At the edge of the talus and in the south end of the cave, Zone H overlay a light yellowish-colored layer of small scaly rocks (Zone I), about 30 cm. in thickness, while to the east and north, where we had difficulty distinguishing the hard-packed scaly roof fall from the thinly bedded stratum of the cave floor itself, it seemed to lie directly on the cave floor (Zone J).

There were no features or hearths noted in Zone H. It covered so small an area that it must have been occupied by an extremely small group. The thinness of the stratum further suggests an extremely brief occupation or occupations. We can't be certain about the season of the year but the presence of a mortar, a muller, and a muller fragment, which could have been used for grinding seeds, does suggest that at least part of the occupation or one of the occupations occurred in the spring of the year.

The four components of a single deer and the many burned or scraped pieces of crushed bone, with the projectile point fragments, suggest hunting, lance ambushing variety, as one of their subsistence activities. The rabbit bone may indicate some trapping. The mortar and muller fragments may indicate the initial collecting of the seeds to be ground. Butchering the animals may have occurred outside the cave, and the

crude blade, side-scrapers, and bifaces, might have been the tools of the trade. Fire-cracked rocks and the burned bone fragments may indicate some food was roasted. The many finely-cracked bones may indicate that they made marrow stew; the cobble hammerstones may have been used to crack up the bones.

Except for the grinding stones which may have been manufactured during occupation, most of the other activities seem to have been connected directly or indirectly with the hunt. Over 30 flint chips, 1 with an unprepared platform and 6 with prepared platforms, were found in this small area of occupation, as well as a blade, and 4 side-scrapers, all with prepared striking platforms, 10 other chipped stone tools and a cobble hammerstone. This suggests a major activity of flint knapping, mostly done by the direct percussion methods. Further, the single scraper-plane fragment may very well have served as a core, for not only does it have long flake scars on its dorsal surface, but also nibbling scars on its ventral surface, which may have been the preparation of a striking platform. Also, the biface fragment and both of the thin percussion-flaked ovoid bifaces could well have been blanks for projectile points that were either broken or discarded before they were chipped into their final form. It might be added, that both the point tip and the crude Nogales point, although they do bear some fine chipping on them, seem to have been predominantly, if not totally, made by percussion-chipping. In fact, only the spokeshave and two of the side-scrapers show clear evidence of pressure-flaking. Thus, during the waiting periods between hunts, the tools for both the killing of the animals as well as scraping their skins, or butchering them, were being manufactured. Tools for scraping skins or butchering were the keeled end-scrapers, the domed scraper-plane, perhaps the bifaces (if they were not point blanks), the blade, and four side-scrapers, and perhaps the spokeshave. This latter implement, however, seems more likely to have been used for woodworking. It has some rather irregular scars in its concavity such as occur from scraping wood. Further, the concavity is about 2 cm. wide and 1 cm. deep, just the right size for scraping a projectile or lance shaft.

The artifacts, although not numerous, indicate that this occupation should be considered a probable El Riego component. Its stratigraphic position under the Carbon-14 dated Zone G, as well as the seriation of its artifact types, suggests that Occupation 1 occurred in the general time period from 6800 to 6100 B.C.

The Way of Life of Zone G

Zone G was a dark brown stratum composed of

rotted vegetal material, some burned soil and rocks, and reddened scaly rock. In the main it was about 20 cm. thick, but thickened to about 40 cm. right at the edge of the talus and faded into greenish rock fall towards the back of the shelter. It covered an ovoid area of about 11 to 12 square meters extending from S3E1 to S3E4 to N1 to N1E2. To the southeast it covered Zone H, but elsewhere it overlay either the rock floor (Zone J) or rock fall (Zone I). It, again, must have been laid down by a small group or groups during a brief period, or short periods. The lizard bone and the metate, mortar, muller, and milling-stone fragments suggest a spring and wet-season occupation or occupations.

Deer bones, large bone fragments, the 3 point fragments, and the Trinidad and Abejas points, all suggest that one of their main subsistence activities was hunting, by stalking with atlatl darts. The rabbit and lizard suggest trapping. The 8 milling-stone fragments, the ovoid muller, the trough metate, the 5 mortar fragments, the flaring-rim mortar, and the conical pestle, suggest that seed collecting was perhaps just as important to them as hunting. One of the flat scraper-planes had a luster on its ventral surface, suggesting the scraping of leafy plants they had collected. Fire-cracked rock and burned bones suggest roasting of food, and there was a little evidence of finely-smashed bone by the 2 ellipsoidal or 2 flake choppers or spherical-battered pebble for marrow stew.

Other activities of the occupants of Zone G are much like those of Zone H. Most of the grinding tools previously mentioned were probably manufactured during their stay in the cave. Again, there was abundant evidence, both in the 34 chipped tools, as well as the more than 400 flakes, of flint knapping during their sojourns; and we might add that the 119 flakes as well as the scraper-planes in Square S3E3, suggest this was the workshop area. Their general techniques seem to have been much like those of their predecessors of Zone H, with flakes or tools with prepared striking platforms more numerous (17) than ones without them (4), and with a great emphasis upon percussion-flaking. There were, however, many more different kinds of tools uncovered and more tools (9) showing some evidence of small fine flake scars suggesting pressure-retouching.

Tools that might be connected with the working of hides were also very numerous. Tools that might have been used for the removal of the epidermises from the skin might have been the 1 multi-faceted scraper-plane, the 2 flat-topped scraper-planes, the 2 domed scraper-planes, the 3 long flat-flake end-scrapers, as

well as the crude keeled end-scrapers. It might be added that the proximal end of the last named scraper type showed some evidence of grinding, indicating it might have been hafted. The 2 crude blades, the 4 thin percussion-flaked bifaces and the 3 thick side-scrapers with one edge retouched, the thick flake with one edge utilized, the two thin flakes with edges retouched, and the thin flake with a part of one edge utilized could have been used to tailor skins, as well as all-purpose cutting tools. Woodworking tools would have included the single gouge and the two spoke-shaves.

The complex of artifacts in Zone G suggests that it is a component of the El Riego Phase, while the Carbon-14 date of 6040 ± 300 B.C. (I-758) suggests the occupation took place between about 6300 and 5800 B.C. (*Radiocarbon* 11:96).

The Way of Life of Zone F

Zone F was readily distinguishable from Zone G, as it was yellow-brown in color and composed of fine flakes of roof fall, some yellow silt, blown into the cave, brownish refuse, and some specks of charcoal. For the most part, it was about 10 cm. thick, but in the center of the cave its thickness was about 20 cm. It overlay Zone G, but did not extend quite so far north as the latter, and only covered an area of about 10 square meters. Again, like Zone G, it seems to have been a brief hunting camp or camps of one or more small groups. Exactly when it occurred is difficult to determine, but the mullers do suggest that at least part of the occupation occurred in the spring when seeds for grinding became available.

The artifacts and refuse found in this zone, although less numerous, are extremely similar to those of Zone G, and indicate the probability that the activities of the two were much alike. The bones of at least one deer, the many smashed bones of large mammals, the Tilapa and Abasolo points and point tips indicate hunting as one of their major activities. The point types may mean that some hunting was by lance ambushing (utilizing the Abasolo point), while some was by atlatl dart stalking (utilizing the Tilapa point). The rabbit bones, particularly the snapped radius, may indicate the use of traps; the mullers may indicate seed collecting. Butchering the animals seems to have been done outside the cave, perhaps with implements like the 3 blades, or the side-scraper with one side retouched. Some bones were smashed, probably for marrow or to make marrow stew, perhaps by the cobble hammer, ellipsoidal chopper, or chopper fragment. Also, the single Nicolas burin may have been

used to split bones, perhaps so the marrow could be extracted. Four bone fragments and one deer tibia were charred. This suggests that some of the meat was roasted. We found no hearth area in the zone.

One of the major activities besides that of subsistence (mainly hunting) was flint knapping. The large flakes removed from 14 artifacts, as well as the size of the 36 chips, in association with a cobble hammerstone, are evidence that knapping was predominantly by the percussion technique. Seven of the chips and two of the artifacts have prepared striking platforms, and the ventral surface of both the so-called domed scraper-planes have chipping along their ventral edges. This suggests that the common method of deriving flakes was by striking them off conical cores with prepared platforms, by blows with a cobble hammer. It must be added that this was not, however, the only method used, for one blade and one flake had no prepared platform, and one flake had a pointed platform (suggesting indirect percussion). Both the flakes as well as the cores were then further roughed into shape by percussion blows. The burin also was made by a more skillfully directed percussion blow. Only the side-scraper, the 3 point fragments, the gouge, and the crude long flat end-scraper show evidence of pressure-retouching. The antler fragment may well have been part of the tool used to do this. Thirty-two of the 36 chips come from between the E3 and E4 axes, indicating that it was in this area, the front of the cave, and around the edge of the talus, that probably was used for chipping. The gouge fragment may also have been used for woodworking, perhaps for making hafts for some of the flint tools mentioned above.

It seems another activity was scraping (either skins or plants), by use of the domed scraper-planes, the flat-topped scraper-plane, or the crude flat-flake end-scraper. Probably, also, the 4 muller fragments and ovoid muller were ground out of river pebbles during their stay.

The blades, scraper-planes, point types, and mullers indicate that Zone F was probably an El Riego component. The radiocarbon determination of 6040 B.C. \pm 225 (I-759) (*Radiocarbon* 11:96), which is almost the same as that of Zone G, confirms this cultural and chronological placement.

The Way of Life of Zone E

Zone E was a thin, 5-to-20-cm.-thick, layer of light brown refuse containing some charcoal and small rock-fall slabs. It not only covered all of Zones F and G, but to the north and west extremities of our excavations, it lay on the cave floor itself. The zone covered about

17 to 18 square meters and had a burned hearth-like area near the 0-0 point. Thus, again we seem to have a brief microband camp or camps in the shelter. The complete lack of any sort of grinding stones suggests that the occupation or occupations took place during the dry season.

Although we did find a small fragment of a scraper-plane that might have been connected with plant collecting, most of the evidence for subsistence points to hunting and trapping activities—the deer and rabbit bones, the point, and the thin biface fragments. Some bones are burned, suggesting meat was roasted on the fire-cracked pebbles found on the hearth. The 8 blade fragments and 5 scrapers may have been used to cut the meat, while the 5 choppers may have been used to split the bone.

Again the evidence points to flint-knapping activities, mainly by the direct percussion technique; the spoke-shave may have been used in woodworking. The keeled end-scraper, the scraper-plane, the blade and side-scrapers may also have been used to prepare hides.

Although the artifacts were not numerous, they do suggest that this probably was an El Riego occupation.

The Way of Life of Zone D²

Above Zone E, there was a slightly more complex stratigraphic situation. Along the N2 and N3 axes, Zone E, the light brown stratum, was overlaid by an easily distinguishable brown stratum designated Zone D. However, as we moved farther east and south, this lower portion of the dark brown layer divided into two other distinguishable components; a lower more reddish-brown component overlaid by a yellowish rock-filled stratum with the darker brown layer on top of it. These were designated Zones D², D¹, and D respectively. In our initial analysis (and in the catalogue), the materials from Zones D¹ and D² were treated as a unit; we assumed they represented a single occupation. Later analysis of our feature sheets revealed, however, that Zone D² had a hearth representing an occupation or occupations on it, while the overlaying stratum, Zone D¹, did not have any features; thus, representing later, rather brief occupations or an occupation. Zone D in turn had two hearths on it, representing still a third occupation or group of brief occupations. Fortunately, the field notes and square descriptions were clear enough so that we could find out exactly which artifacts came from which zone, D¹ or D².

Zone D² was only about 10 to 20 cm. thick and covered only about 10 square meters. The hearth area was about 50 cm. in diameter and 20 cm. deep and

centered at about S5E1. The occupation or occupations was obviously by a small group for a very brief time. The muller or mano fragment, the 3 milling-stone fragments, and the ovoid muller suggest that they collected some seeds and that part of the occupation or occupations occurred in the spring. The 3 deer bones, the 20 or so burned cracked bones, and the thin biface fragment were all evidence of hunting. The 2 blades, the blocky-core chopper, the 2 ellipsoidal choppers, the side-scraper, and the ovoid biface may have been used in butchering the animal, or cutting or chopping up the meat or vegetal foods, before roasting on rocks on the hearth.

The six chips, three of which could be fragments of broken artifacts, indicate little or no chipping during their stay, nor is there evidence of woodworking. In fact, the only other evidence we have is of scraping activities (skins). It consists of the crude ovoid end-scraper, 2 scraper-plane fragments, a thin-flake end-scraper fragment, and a discoidal scraper.

Although the artifact evidence is slim, the radiocarbon determination of charcoal from the hearth of 5975 B.C. \pm 250 (I-658) suggests that Zone D² was an El Riego occupation (*Radiocarbon* 11:95).

The Way of Life of Zone D¹

Zone D¹ was composed mainly of rock fall, a few pieces of charcoal, artifacts, and refuse, and there was no clean-cut floor or hearth to indicate a definite occupancy of the shelter. The stratum was light brown to yellowish in color, varied from 10 to 20 cm. thick, and covered almost exactly the same area as Zone D¹. The milling-stone fragment and ovoid muller indicate that the inhabitants collected seeds, and were there at least during the spring of the year. Only fragments of bones were found; they were of large and small mammals, suggesting both hunting and trapping. Although the two side-scrapers and the flake chopper may have been used in butchering the animal, cutting the meat, or obtaining marrow, there is no evidence of how they prepared it for eating (if indeed they did). The 2 long flake end-scrapers, the scraper-plane fragment, the 3 flat-topped scraper-planes, and the multi-faceted scraper-plane may have been used to scrape the skins of the animals. The latter tool may, however, have served as a core, as it has a number of prepared surfaces and was associated with about 50 flakes, 4 of which have prepared striking platforms.

The tools from this layer seem to be El Riego types and the radiocarbon determination of 5725 B.C. \pm 250 (I-765) tends to confirm this cultural assignment (*Radiocarbon* 11:96).

The Way of Life of Zone D

Zone D was a distinctive dark brown stratum that seemed to be composed mainly of burned or disintegrated vegetal material. It was apparent in all squares excavated, and further extended into the unexcavated portions to the north and south. It varied from 5 to 25 cm. thick with the thinnest portions in the center of the excavations. Poorly-defined hearth areas occurred in Squares N1E1 and S3E4 over thicker portions of the refuse. From the above, it might seem possible that we excavated only part of a macroband occupation or part of a number of microband occupations. The only indications of the season are the two mano or muller fragments and the ovoid muller, which may mean a possible spring occupancy. These, of course, definitely indicate seed collecting; the one flat-topped scraper-plane had luster polish on its ventral surface to suggest plant scraping. The Coxcatlan, Abejas, and Tilapa points, and the 6 unidentifiable fragments of large mammal bones indicate hunting, perhaps by the dart-stalking as well as the trailing method. The 3 thin side-scrapers, the crude blade, and the 2 bifaces (besides other uses) could have been used in the butchering process. The two chopper fragments also could have been used to break up bone into the fine splinters we uncovered in Square 0-0. The blocky-core chopper and the 2 hemiconical cores with prepared platforms, as well as the chips concentrated around the hearth areas, give evidence of flint knapping during their stay or stays. Again, much of their chipping was done by the percussion method on prepared platforms, but the points and 3 side-scrapers show they also did some pressure-retouching. The mullers also probably were ground cut from local pebbles during their stay. The crude long flat-flake end-scrapers, blade, and side-scrapers may also have been utilized in working hides.

The point types, as well as the other tools, indicate that Zone D was an early Coxcatlan Phase occupation, roughly from 5000 to 4400 B.C.

The Way of Life of Zone C

Zone C is composed mainly of flakes of greenish rock that eroded and slid off the back wall of the cave. It obviously is not a true occupational layer, although it contains both artifacts and refuse. What we suspect happened is that during the deposition of Zone C some people did occupy the layer, but that any discernible floor or features became obscured by the sliding process of the deposit. Thus, there is little we can say about the size or duration of any possible occupancy of the zone.

The deer and rabbit bone in Zone C do suggest that the inhabitants during this period hunted and trapped, while the 4 milling stone-metate fragments and mano-muller fragments suggest seed collecting or corn agriculture. The discoidal chopper and blades may indicate food preparation activities. Again chips, blades, the cobble hammer, and abrader hammer suggest flint knapping, while the thin-flake end-scraper, the domed scraper-plane, and ovoid end-scraper may indicate hide-preparation activities. The fine blade fragment and the fine obsidian blade with an unprepared striking platform seem to indicate that Zone C and the artifacts therein were deposited during Abejas times.

The Way of Life of Zones B, B¹, and B²

Overlying the rock fall of Zone C in the west part of the cave and Zone D to the east along the talus stratum, was another rather complex stratigraphic situation, which, for purpose of analysis, was lumped together as Zone B. In fact, this zone was composed of three strata; the oldest of which was the thickest (30 cm.), and overlay Zones C and D in the south end of the shelter and to the north disappeared at about the South 1 axis. In the field this stratum was called Zone B² and was composed mainly of rock fall which had become stained yellowish-gray by the charcoal of Zone B. It contained bones, chips, and 3 thin side-scrappers. Zone B¹ was much like it. It was as deep as 40 cm. on the south end of the cave but pinching out at the east-west 0 axis. It also was composed of rock-fall stained dark gray and contained flint, bone, 3 thin side-scrappers, 1 crude blade, a chopper fragment, and a piece of a milling stone. Both of these strata we believe were formed like Zone C; they are mainly rock-fall and slide deposits that incorporated some remains of human occupation in each of them. Neither were true occupational levels in contrast to the overlying Zone B. Zone B was a dark layer from 10 to almost 50 cm. thick that covered the whole cave floor and was capped by a layer of charcoal. Except for the artifacts noted above, all those included in Zone B in the analysis—the identifiable bones and the preserved vegetal materials—came from the charcoal top of the zone which seemed to represent an occupation by a macro-band or occupations by a number of microbands during a very brief span of time. The 59 chupandilla seeds and the 3 cosahuico pits suggest a fall occupation while the 4 tetecho remains suggest a winter occupation; the grinding stone suggests spring. We have interpreted this as indicating a series of brief visits by microbands that started in fall, continued through the winter, and ceased during the early spring.

Their diet during this period was mainly meat, although they did collect some fruits in the fall, tetecho in the winter, and seeds in the spring. Whether either of the fruits were domesticated at this time is problematical. The 4 bones of at least one deer, and the Flacco, San Nicolas, and Garyito points, suggest some of the meat was obtained by the dart-stalking type of hunting. The rabbit bones may indicate some trapping. The fine blade, the 3 thin side-scrappers, 1 thick side-scraper, the large bifacial disk, and the thin square-based biface may have been used in butchering these animals (outside the shelter); the two discoidal choppers may have been used to mash the bone into some sort of delectable mass. Seeds were prepared for food by grinding with the 9 manos or mullers, the 4 ovoid mullers, and the cuboid pestle in the four milling stones.

Again another major activity during their hunting sojourns was flint knapping. The packed end of the cuboid mano may have been used to strike some of the flakes from the so-called discoidal core chopper, and 12 of the more than 100 flakes had prepared striking platforms; only one flake had an unprepared platform. Six flakes, however, had rather pointed platforms indicating that perhaps some indirect percussion-flaking was done. The blade, of course, means that neatly-made nuclei were also utilized. Somewhat in contrast to the earlier levels, a number of tools show evidence of fine pressure-retouching. These would include the 3 points, all of the 3 side-scrappers, the 2 spokeshaves, the gouge, the end-of-blade scraper, and the thin flake end-scraper.

The two spokeshaves and the 3 gouges, as well as 2 pieces of cut wood, give evidence of woodworking activities, perhaps making hafting pieces for their tools.

The grinding tools probably also were manufactured from local river pebbles or boulders during one of their stays. There is also considerable evidence of leather-working, in that 4 graters, 1 end-of-blade scraper, 1 thin flake end-scraper, 3 crude discoidal scrapers, 4 crude plano-convex end-scrappers, and 6 long flat flake end-scrappers were uncovered. It might be added that most of these scraping tools occurred in the center of the occupational area.

The tools such as the fine blade, the ovoid pestle, the San Nicolas and Garyito points, the square-based biface, the discoidal choppers, and the scrapers seem to indicate that Zone B is a Late Abejas component.

The Way of Life of Zone A

Overlying the whole deposit in the shelter was a 20-cm.-thick grayish ash layer containing some rock fall

that was designated Zone A. Generally speaking, one does not consider these top layers as representing a single occupation or even one period, but this one might be the exception. Most of the artifacts we found in the layer came from a single bell-shaped one-meter-deep pit in Square S4E2 which probably extended into Squares S5E2 and S5E3. Found in this pit was a rabbit scapula, 2 sherds of Coxcatlan Brushed, 2 El Riego Gray sherds, 2 Quachilco Gray sherds, 1 muller or mano, 1 metate fragment, 1 ovoid muller, 2 thick side-scrapers, a biface fragment, a long rectangular pestle, and some cracked bones of a large mammal. This was probably refuse from a single Palo Blanco occupation. The other 6 artifacts and one El Riego Gray sherd come from other parts of the zone, but the Tehuacan point, with an associated ovoid muller from Square S1E4, the El Riego Gray sherd from Square S1, and even the snapped retouched blade from Square S2E3, are quite typical Palo Blanco artifacts, making one suspect that all the artifacts from this layer are of the same time period, if not the same occupation.

If it were a single occupation, then it was one by a small group for a very brief period. Perhaps also, the Tehuacan point and the large cracked mammal bones are evidence of hunting, while the rabbit scapula is evidence of trapping. The mortar, 2 mullers, and metate and mano fragments would be evidence of seed-collecting or grinding of agricultural produce. The snapped blade, chopper, the biface, the thin side-scraper, and the two thick side-scrapers could also have been utilized in food preparation. Since all the sherds had carbon adhering to their inner surfaces it would seem probable they cooked at least some of their food in pots.

Other Sites Tested

Tc 273 and Tc 274

In our original survey we dug post-hole tests into Tc 273 and Tc 274 on the east side of Abejas Canyon, about half a kilometer north of Tc 307. The meager remains from these shelters indicated the possibility that they had Abejas Phase components in them. Also, Neely, Woodbury, and Brunet, when studying Purron Dam farther down Lencho Diego Arroyo, picked sherds out of the bank associated with various dam features, and MacNeish dug a 1-meter square in Tr 15. The results are discussed in Vol. 4, and do indicate most of the dam construction and associated occupation occurred from Santa Maria to early Palo Blanco times, although a pyramid was built on top of Purron Dam in Venta Salada times. In fact, the only real test-

ing of a site in the Lencho Diego region was at Ts 365, and even here it produced few artifacts and the recording of the testing was not of the best.

Ts 365

Ts 365 was located on a mesquite- and cactus-covered terrace directly eastward, below (about 4 meters) Abejas shelter. It was between the shelter and Abejas Arroyo that was in turn 2 to 3 meters below the surface of this 20-to-30-meter-wide terrace. Initially, MacNeish dug 5 squares in the site, Squares 0-0, E1, E5, N1, and N5, and found at a depth of between 30 and 45 cm. below the surface, a dark humus-like stratum called Zone C. In this stratum were found refuse and artifacts, as well as hearth-like areas of fire-cracked rock in Squares N5 and E5. Zone B above it, from 15 to 35 cm., was a stratum of alluvial deposits, while Zone A was the top humus and contained a few chips, 2 long manos, and 6 sherds, 3 of which might be El Riego Gray.

The final task of testing the site and mapping it was assigned to a student assistant. Unfortunately, records of his map or field notes (if there ever were any) never turned up in our files in Tehuacan, although we did find a catalogue of materials from the site as well as the artifacts. The catalogue indicated the site extended from at least S20E5 to N10, and from E10 to W5, an area of at least 450 square meters. In addition, two other possible hearth areas occurred in Squares S15E5 and S20E5. This certainly would seem to have been occupied by a macroband but the sparsity of artifacts would suggest it was of short duration. Further, the mention of a turtle shell in the catalogue suggests that this brief macroband occupation was during the wet season.

The burned mammal bones and the Tilapa, Shumla, and Catan points suggest one of their activities during their sojourn was hunting, while the mano suggests the grinding of corn. Further, the site's location would suggest barranca agriculture. The hearth indicates food was probably roasted on hot rocks, and the fine blade, slab chopper, 2 thin and 1 thick side-scraper, while they may have had a variety of uses, could have been used in food preparation. The point types, oblong mano, and fine blade fragment would seem to indicate that Ts 365 was a late component of the Coxcatlan Phase.

Summary of the Cultural Sequence in the Lencho Diego Locality

Although the data is not overwhelming numerically, our sequence of components in the Narrow Canyons

and Dissected Alluvial Slopes environmental zone from 7000 B.C. to about 600 A.D. is extremely complete. Whether the lack of sites or components in the period before 7000 B.C. is due to a lack of exploitation by early man, or simply due to our rather inadequate reconnaissance, is unknown. Our lack of Venta Salada components after 600 A.D., however, is just poor selection of sites for excavation, for our reconnaissance discovered many sites of that period.

The Preceramic sites from 7000 B.C. to 2300 B.C. are extremely homogeneous and rather distinctive from those of the other micro-environments. Except for the latest excavated Preceramic site and one possible Coxcatlan open site, all of them were brief microband occupations, the majority of them occurring in the spring. Activities were extremely limited and were concerned mainly with subsistence, either hunting or plant collecting. Flint knapping and skin preparation often occurred in conjunction with the hunt camps, while the plant-collecting sojourns were more concerned with woodworking or skin-working.

Unlike the Travertine Slopes or the Alluvial Slopes zones, summer camps by either microbands or macrobands were extremely rare; in fact, only one occurred and it was a hunt camp. It would seem that none of the initial developments toward agriculture took place in Lencho Diego. Also, there were only six possible dry-season components and four of these were not really occupations at all but were fundamentally concerned with burials. This is a very different pattern from that of the El Riego Oasis and the humid Valley Center environs, which had true dry-season occupations often concerned with hunting; and, of course, it is also very different from the occupations in the Travertine Slopes, none of which were in the dry season, and in the Alluvial Slopes with its wide variety of kinds of dry-season occupations.

After subsistence agriculture came into use during late Preceramic times, and up until Middle Formative times when irrigation agriculture took over, there developed a new means of exploitation. During this period it seems probable that the real homes of the cave inhabitants were in the nearby villages and hamlets and that the occupations in the caves were brief and for special purposes. Undoubtedly, one of these

special purposes was to plant and harvest crops; still, more extensive woodworking was also undertaken, not only for making tools but also to obtain larger materials for constructions. Also at this time as many of the occupations were by macrobands as were by microbands.

As indicated in previous volumes, irrigation agriculture in Late Santa Maria and Early Palo Blanco times (800 B.C. to 100 A.D.) and the building of Purron Dam had a profound effect on cultural development in the Tehuacan Valley. Although we did not dig any of the major villages or towns showing these developments in the Lencho Diego locale, a new pattern was still apparent in the away-from-home occupations in the caves we did excavate. The earlier subsistence pattern of spring and fall microband or macroband camps continued to occur in our caves, obviously brief sojourns away from homes in nearby villages and towns. This, of course, is similar to that of the previous stage, but there is a major difference, not only from that stage but also from other contemporaneous exploitation of other micro-environments in the valley. That is, the harvest of the fall plants was a bountiful one and included a whole host of plants which probably grew around the lake formed by Purron Dam. Somewhat reflecting this "higher standard of living" is the fact that, besides woodworking and flint knapping, the inhabitants were now involved in weaving, not only cotton loom-made fabrics, but also baskets, mats, petates, and sandals.

Once the dam ceased to function in Middle and Late Palo Blanco, there was a shift back to the older pattern of brief stays with few activities by microbands in the spring and fall. Our sample from cave excavations simply did not reflect the major developments that were taking place in the villages and towns. Finally, in Venta Salada times the Lencho Diego locality became a backwater area, like it is today, with little evidence of anything but very brief visits into it. In no way did it reflect the growth of city-states and the accompanying cultural advances that were occurring around such centers as Los Cues, Tilapa, and Teotitlan del Camino in other parts of the Dissected Alluvial Slopes zone.



CHAPTER 4

Excavations in the San Marcos Locality in the Travertine Slopes

Richard S. MacNeish and Angel Garcia Cook

EXCAVATION IN THE VICINITY of the western travertine slopes began in San Marcos and Tecorral Caves during the first two months of 1962, following the discovery of Tecorral Canyon by MacNeish on December 10, 1961. On that day Fred Peterson had taken MacNeish and Francisco Molina to see a small rock shelter just to the east of the canyon. The cave was not worth excavating, but, returning to the car, MacNeish noticed the canyon to the west and the type of limestone cliffs that form rock shelters with good preservation. Tecorral Canyon was then traversed from its mouth some 2 kilometers upstream to where San Marcos Cave was located, and the next day Peterson,

Tejeda, Molina, and MacNeish walked it out in its entirety.

It was a profitable day. A group of six small caves was found in the southeastern part of the canyon (Tc 254, Tc 255, Tc 259, Tc 260, Tc 261, and Tc 266) as well as two more 100 meters north, Tc 256 and Tc 257. On December 28th MacNeish returned to the canyon with Molina, Tejeda, and "Raton" Perez to begin testing in San Marcos and Tecorral Caves, the best of the group of six. Excavation was under the direction of Angel Garcia Cook and MacNeish. Tests were also made in Tc 256 and Tc 257 to the north. Later, in May, 1962, Tc 7 above San Andrés was

tested, and in the spring of 1963 digging began in Ts 381 near Chilac. Most of the investigation in the locality was by testing, mainly in pre-ceramic sites; however, the information from excavation was supplemented by a considerable amount of survey undertaken in the area, reported on in Chapter 7.

The western travertine slopes lie west and southwest of the broad plains or steppes of the valley center. They extend from the Cerro de las Mesas, or El Riego locality, northwest of the city of Tehuacan south to the Rio Calapilla. The zone is crossed by the Zapotitlan Valley from Acatepec in the west, following the course of the Rio Zapotitlan. The river flows southwest and enters the valley just west of San Gabriel Chilac before continuing its course southeast to join the Rio Salado. The river and its tributaries cut into the travertine slopes, forming the canyons, terraces, and limestone cliffs characteristic of the zone. Slopes on either side of the valley give way to the alluvial higher hills of the Sierra de Zapotitlan to the west and northwest and the Sierra de Atzingo to the southeast. The slopes themselves and the canyon bottoms are considered to be the two major subdivisions of the zone. Two lesser subdivisions are the flanks and the summits of hills and mesas. The significance of these divisions becomes apparent in our chapter on survey sites.

Geologically, the Travertine Slopes micro-environment coincides closely with the outcropping of the Tehuacan and underlying Miahuatpec formations formed in early Cenozoic times, possibly of the Eocene or Paleocene Period (see Vol. 1 of this series, Chap. 5). Erosion of the underlying travertine and limestone impregnated the soils with lime and they are infertile today. The zone has the least amount of annual rainfall in the valley—under 500 mm.—and, in many places, annual rainfall falls below 400 mm. Only about 107 mm. of rainfall a year is considered useful; most of this falls in July, August, and September. Temperatures range between 1° and 43° with a mean annual temperature of about 22°. The zone can be both the coldest and the hottest part of the valley.

The barren soils, the wide range in temperature, and the limited rainfall of the western travertine slopes have provided a particularly inhospitable vegetation; many areas are barren with only the gleaming white of the travertine to characterize the surface. However, most of the locality is covered by yucca (*Yucca periculosa*), barrel cactus (*Echinocactus grandis*), organ cactus or tetecho (*Cephalocereus hoppenstedtii*), mala mujer (*Jatropha neopauciflora*), prickly pear cactus (*Opuntia*), sotolin (*Beaucarnea gracilis*), spiny leaf bushes (*Tillandsia* and *Hechtia*), maguey (*Agave*),

and occasionally palm-like bushes (*Brahea dulcis*). In the gravelly terraces in the canyon bottoms where the soils are deeper and some water flows (usually underground), there are more grasses (*Setaria* and perhaps originally *Zea mays*), an occasional mesquite tree (*Prosopis juliflora*), and some trees or bushes with pods (*Acacia*, *Leucaena*, and *Mimosa*). Although some cactus and *Opuntia* fruit throughout the year, the majority of the edible wild plants are from the terraces and yield food only in the wet season. With the aid of agriculture the zone can produce an appreciable amount of food, but then only in the wet season or with the aid of irrigation.

Food from animals is just as scarce. There are no big game such as deer, although we did find bones of a peccary in excavation. Antelope bone was found in the lowest levels of Tc 255 in Tecorral Canyon; however, they may have been of late Pleistocene times when the zone was a grassland. Most of the animals are small and numerous only in the wet season—jack-rabbit (*Lepus callotis*), audubon cottontail (*Sylvilagus audubonii*), Mexican cottontail (*Sylvilagus cunicularius*), skunk (*Mephitis macroura*), gray fox (*Urocyon cinereoargenteus*), gopher (*Cratogeomys*), and mice and rats. Owls, quail, and white wing dove, turtles, and racerunner lizards complete the list.

Within the larger geologic zone, Tecorral Canyon cuts into the limestone cliffs at a point approximately seven kilometers south of the city of Tehuacan about four kilometers equi-distant between Coapan and San Marcos. It follows a northwest-southeast direction, with headwaters just below the edge of the Tehuacan-Zapotitlan highway. In the southeast part the arroyo is relatively wide, although sinuous in its course. On either side, three terraces rise to elevations of three meters, twelve meters, and the highest to between twenty and twenty-eight meters. The sides of the canyon are very steep, the surrounding travertine-covered hills sometimes rising as high as 100 meters above the arroyo. The lower walls of the canyon have outcroppings of relatively thinly-bedded stratified limestone; above them are the travertine soils. The thinly-bedded limestone forms cliffs three to often sixty meters in height, and erosion of weaker strata has caused small rock shelters. It was in the largest of these limestone cliffs, about two kilometers from the mouth of the canyon on the south side of the arroyo, that Tc 254 and Tc 255 were discovered.

Northwest about a kilometer, the canyon bifurcates into a northern and a western arm. In this section the sides of the canyon are steeper, and, without the arroyo terraces, limestone cliffs with rock shelters are

less prominent. At present there is no permanently flowing water supply in Tecorral Canyon and, in most rainy seasons, there is little if any flooding. However, the sharpness and freshness of the terrace cuttings along the edge of the arroyo indicate that on occasion torrential waters must flow in the canyon.

The vegetation on the surrounding travertine hills is distinctive and typical of our western ecological zone. *Yucca*, *Agave*, and *lechugilla* share the barren soil with saguaro and barrel cacti. The underlying rock, with little topsoil, allows for few grasses and only a rare tree. The terraces at the bottom of the arroyo, however, make up a little ecological world of their own inside this cactus desert. Heavy growth of grass, many more *Agave* trees, and, along the flanks of the cliffs, thickets of mesquite trees create a somewhat more fertile environment. Most of the barrel and taller cacti are absent in the bottoms of the canyon. The soils of the terraces are gravelly and there is a sandy humus-like topsoil.

It seems, then, that there was little reason for early man to move into this zone with any thought of eking out a subsistence for any length of time. In the rainy seasons, however, a few plants could be gathered and some small animals either trapped or collected. With the coming of agriculture, terraces could be farmed in the wet season and Tecorral Canyon dammed and terraced for irrigation agriculture. Perhaps the greatest inducement for lingering in this barren land was the numerous salt seeps for salt manufacture and the deposits of chert, onyx, and limestone for quarrying. Further, hilltops and mesa summits probably served well as defensive locations for some of the later villages that dominated the passes and canyons into the valley from the west.

San Marcos Cave

San Marcos Cave is located in the high limestone cliffs in the southeastern part of Tecorral Canyon, the second from the northernmost of the series of six caves discovered there by MacNeish in December, 1961. Long and narrow (21 meters), the cave is about thirty meters above the south side of the arroyo bottom. It has a maximum overhang of five meters and faces northwest. Below the cave, a 7-meter talus slope rises to a broad high terrace about 200 meters long and 50 meters wide. The floor of the cave slopes gently downward to the edge of the overhang and then drops into the steep talus slope. The back of the cave is only about a meter high and has little head room, but at the mouth, or the edge of the overhang, the roof is about

4 meters high. The surface, before excavation, was covered with goat dung and large rocks.

On December 29, 1961, a 1-meter square was put down in the center of Tc 254. This test later was numbered Square 0-0. It was an extremely lucky sounding, for this turned out to be archaeologically the richest cubic meter in the entire cave. There were five obvious floors and a great quantity of corn cobs, most of them extremely primitive and small. On January 2, 1962, MacNeish returned to the cave with the "back of the yards" crew of ten from the squatters' barrio of El Riego in the town of Tehuacan. This began a three-week major excavation effort, which terminated on January 22. During the last week of the excavation MacNeish was joined by Angel Garcia Cook who had completed the excavation of Tecorral Cave and came to assist in finishing up San Marcos.

Our preliminary sounding was just behind one of the large rocks in Square 0-0; a second square dug behind this large rock was W1. It was obvious at that time that it would be difficult to obtain long neat vertical faces at any one portion of the cave because of the large amounts of rockfall. For that reason we decided to start a trench outside the cave and to try to roll the rocks out and down the talus.

Before beginning the trench, we staked out the cave in 35 1-meter squares, roughly forming a rectangle 3 to 4 meters wide and 7 to 9 meters long. The initial excavations were at the edge of the talus just outside the overhang. At first we put down alternate squares in N3, N3W2, and N3W4; by digging the squares between we formed a trench 6 meters long and 1 meter wide. We hoped we could move this trench southward, rolling out the rocks, and we went forward. This proved to be unsuccessful, as the uncovered rocks were gigantic. We then decided to try to get around the large rocks in the center of the cave and move along a profile from the west towards the east. Thus Squares N1W6, N2W6, W6, and S1W6 were completed, giving us a 4-meter face to work eastward on. It became immediately apparent that the stratigraphy in this western end was nowhere as complete as it was in the east end and, furthermore, there was little preservation. In fact, further digging westward in W7 and W8 revealed no preservation at all. Probably at some time during the occupation of this end of the cave there had been some sort of water seep. In spite of these difficulties, we moved eastward; first into Squares S1W5 and N1W5, and then took out alternate Squares W5 and S2W5. By a somewhat similar method we carried the trench forward to the W4 and W3 axes. In these excavations we worked on a vertical profile in alternate

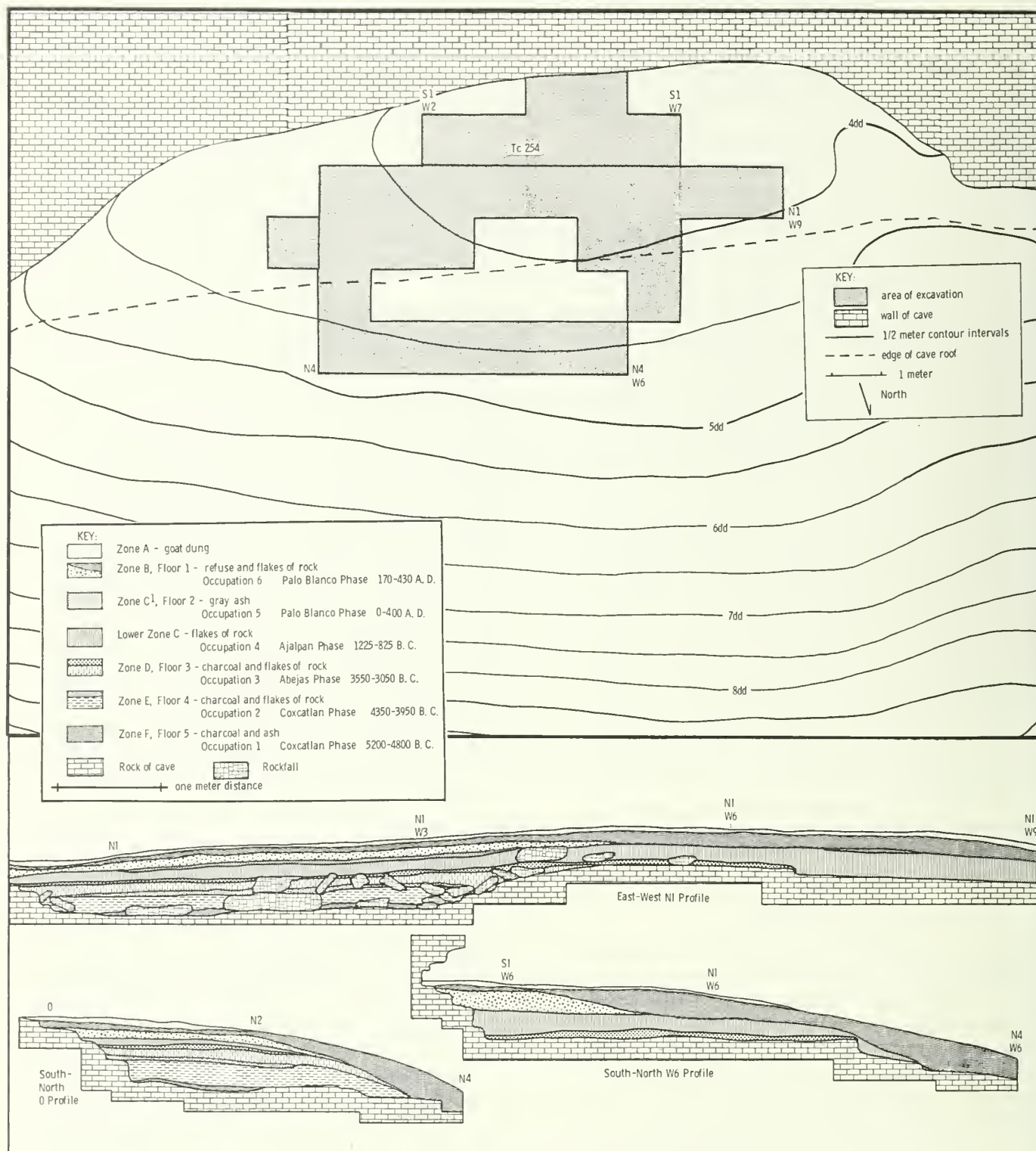


Fig. 56. Contour map and profiles (below) of Tc 254.



Fig. 57. Initial excavations in San Marcos Cave, viewed from the west.

squares. In excavating a square we used a three-man team. The first man peeled off the topmost stratum in front of him from the vertical profile with a trowel and paintbrush. The artifact material he found was recorded as to its location and put into a bag with the correct layer and square designation. The second man took the excavated dirt in a bucket to the third man who sieved the material through a one-meter screen well outside the cave so that little dust could flow back. The third man also kept a bag of his finds from the screen and made out the labels. During the excavation of each square, MacNeish made notes about their finds both in a daily diary and on a description sheet of the square they were excavating. After the first stratum had been stripped off, the second cultural stratum was removed in the same manner. This process was repeated until the rock floor of the cave was encountered. In the excavation of culturally undisturbed materials

no tool larger than a trowel was used, and the few shovels we had were used only around the screen for moving back dirt. While this western excavation was going on, MacNeish continued working along with a couple of assistants at the east end where the materials were the richest and the stratigraphy the best. Eventually we had a trench that extended from Square 0-0 to N3 as well as around the large immovable rock in Squares W1 and W2. At a later date, since there was now a complete profile in a vertical face from 0-0 to N4, we also dug N1E1.

This was the most difficult cave to excavate because of the large rocks that had fallen from the roof and were sprinkled throughout the floor; except for cultural materials there was really no dirt in the cave at all, just fine flakes of limestone rockfall. This made it difficult to obtain a neat vertical profile, as there was no consistency to the rock flakes. In spite of this, however,

we had only one landslide of a vertical profile. Another factor made excavation difficult. The rock floor of the cave was in a series of large steps. The first one at about the E-W 0 axis was a step one meter deep, the second one at the N2 axis was about another half meter, and the final one at the N4 axis was about 40 cm. Despite all of these obstacles, the cave was meticulously dug and the notes were fairly complete. Best of all, in the few cultural strata that we found, the layers of preserved vegetal material or charcoal were easy to see against the background of yellow rock flakes.

The stratigraphy of Zone A was a layer of goat dung with modern remains in it. Directly under Zone A was a charcoal floor called Floor 1, considered to be the top of Zone B. This floor was only 2 centimeters or so thick in the east end of the cave; in the west end it became fairly prominent and there were several pits and fireplaces extending down from it. Underneath Floor 1 on Zone B was a layer of yellowish rock flakes 4 to 8 cm. thick capping a second floor. Floor 2 was also composed of vegetable material with some charcoal and again was relatively thin in the east end of the cave. In the west end it blended into Floor 1 with no intervening area of yellow rock fill of Zone B. Floor 2 capped Zone C, a layer of yellow rock fill about 20 cm. thick. In the west end of the cave, Zone C extended down to the floor of the cave itself; but in the east end, that is, from roughly the W4 axis to the E1 axis, this one-foot zone composed of yellow flakes overlay still another floor. This was Floor 3. It capped Zone D and occurred only in the eastern portion of the cave roughly from W5 to E1. Underneath this floor was still another 20 cm. of yellow rock fill (Zone D) which overlay a charcoal stratum in the area roughly from W3 to E1. This was Floor 4 and capped Zone E which extended from W3 to E1. Underneath Floor 4 the yellow rock flakes of Zone E extended to the rock floor of the cave in all but Squares 0-0 and W1. Here right on top of the floor itself was still another charcoal floor, Floor 5 of Zone F (Fig. 56).

The cave was first occupied, then, by a group inhabiting a 2-meter square in the east end to form Floor 5, Zone F. Next, the cave was absented and rock fill from the roof of the cave piled up Zone E. After about 20 cm. had piled up, a second group came in and laid down Floor 4 on top of Zone E in the east end of the cave. Again the cave was absented and more rock flakes dropped from the roof to form Zone D. At about the time that another 20 cm. had piled up, another small group of people came in and occupied the eastern half of the cave, laying down Floor 3. On top of Floor 3 was more rock fill, Zone C. However, unlike

the other zones below their overlying floors, this one contained some refuse and corn cobs, indicating human occupancy even though there was no discernible floor. Eventually, however, after about 10 to 15 cm. had piled up, there was a fairly good-sized occupation of the cave to form Floor 2 on Zone C¹. This occupation (Floor 2) extended over most of the eastern half of our excavated area. Shortly after it, when only 1 to 10 cm. of rock fill had piled up, there was still another occupation, Floor 1 of Zone B. The cave then was unoccupied until modern peoples used it to house goats and occasionally camp (Zone A).

The cave was not overly rich in artifacts; however, all floors contained large amounts of vegetable material, as well as some bone. Our favorite comment at the end of a hard day's work was, "Well, another good day for the botanist."

We were fortunate in obtaining a series of Carbon-14 dates on materials from these floors and zones which gave us some idea of the length of time the cave was occupied. Charcoal from Floor 4 on the top of Zone E had been dated at 4150 B.C. \pm 200 (I-573) and vegetal material from Floor 3 at the top of Zone D had been dated at 3300 B.C. \pm 250 (I-569). Corn cobs and sticks from the lower rock fill of Zone C had been dated at 1025 B.C. \pm 200 (I-566) and a large stick and associated charcoal from a fireplace in Floor 1, capping Zone B, had been dated at 300 A.D. \pm 130 (I-657). Thus, in spite of the relatively shallow deposits laid down in this cave, it seems it housed within it at least an intermittent 5,000-year occupation (*Radiocarbon* 11:96). These dates allowed us to establish a sequence for the occupation of San Marcos Cave (Table 5).

TABLE 5
Sequence in San Marcos Cave (Tc 254)

	<i>Palo Blanco Phase</i>	
Occupation 6	Zone B	170-430 A.D.
Occupation 5	Zone C ¹	0-400 A.D.
	<i>Ajalpan Phase</i>	
Occupation 4	Lower Zone C	1225-825 B.C.
	<i>Abejas Phase</i>	
Occupation 3	Zone D	3350-3050 B.C.
	<i>Coxcatlan Phase</i>	
Occupation 2	Zone E	4350-3950 B.C.
Occupation 1	Zone F	5200-4800 B.C.

What follows are reconstructions of the life of the occupants, mainly their subsistence but some of their other activities as well. None of the floors showed any concentrations of associated artifacts and so we were

not able to establish any activity areas. Our zone by zone reconstructions of prehistoric life in San Marcos Cave are therefore not accompanied by computer plots of artifacts on the floor. Nevertheless, we hope we have presented a pretty fair picture by description alone.

The Way of Life of Zone F

In most of the cave either Zone C, Zone D, or Zone E extended to the cave floor itself. However, in Squares N1 and N1W1 a thin film of charcoal and ash (maximum 2 cm. thick) with some bones and vegetable remains lay on the rock floor. This is considered to be Floor 5 of Zone F. The remains were extremely meager and the occupation could not have been a long one nor one of very many people. The one turtle bone found suggested an occupation during the wet season. During this time they evidently did some trapping. There were also remains of a cottontail rabbit, a gopher, a coyote, and a quail. Wild plant remains were of *Agave*. Five of the eight pieces had been chewed as had a quid of mesquite pod. We also found one very tiny cob of wild corn.

There were, however, nine flint chips, two of which had prepared striking platforms, and two artifacts. Certainly this indicates that during this stay they did a little flint knapping, but just what kind is difficult to determine. The two stone artifacts were a thin flake side-scraper, which, of course, could have been used for cutting meat, and a bifacial crude discoidal chopper, which could have been used for either crushing bone or mashing up plant remains. Neither of these are particularly diagnostic of any particular cultural phase and there is little we can say about what the people did, nor can we classify their remains. We would guess that Occupation 1 was a possible component of the Coxcatlan Phase (about 5000 B.C.) because of the wild corn and its stratigraphic position under Floor 4.

The Way of Life of Zone E

Floor 4 lay on top of Zone E, a 20-cm.-thick stratum of fine flakes of roof fall covering Zone F or the cave floor itself. Above Floor 4 in Zone D were many large pieces of roof fall. The floor layer was composed of charcoal and ash and preservation occurred in parts of Squares 0-0, W1, and N1E1. There was one large charcoal hearth about 50 cm. in diameter and 12 cm. deep in the center of Square N1E1. In total extent this thin floor (about 4 cm.) extended from S1 to N2 to N1E1 to N1W3, covering less than 12 square meters. It was perhaps only a single family or a microband that laid down this floor. The pochote pod indicates

that the occupation may have begun as early in the year as March, and the grass quid and two *Leucaena* pods show that it may have continued through the spring. The turtle, lizard, and wild corn cobs seem to indicate that it lasted on into the wet season, but due to the almost total lack of fruit remains, it did not continue into the fall.

Perhaps the most distinctive plant remains found in Floor 4 were the 21 whole wild corn cobs and 5 fragments. These tiny cobs and the 9 corn quids, however, would have, even with a preservation factor, made up less than 3.3 liters of food. The other wild plant food remains were not particularly impressive. They consisted of 160 *Agave* quids, 1 grass quid, and 1 pochote pod, an estimated 33 liters of food. The remains of a deer, a peccary, 3 cottontails, a gopher, a turtle, and a lizard suggest that these animals were certainly their biggest items of diet and may have represented as much as 29.25 liters of food. Thus, our estimate would show about 45 percent of their diet came from meat and 55 percent from wild plants.

A tool connected with their subsistence activities was the blunted base of a wooden atlatl foreshaft which could have been used in the dart-stalking type of hunting. The one crude blade with a prepared striking platform, the crude blade fragment, the one thick side-scraper with two edges worked, the two thin side-scrappers with one edge worked, and the one thin, neatly chipped ovoid bifacial knife all could have been used to cut up the animals they killed or trapped. Parts of skull and limb bones of all types of animals represented indicate that they were probably butchered in the cave. The flat-topped and domed scraper-planes may have been used for pulping the *Agave* leaves, and the one stone bowl may have been used either for grinding up plant remains or for cooking them along with the meat. Cutting the plants, of course, could have been done by using the side-scrappers or blades or the ovoid knife. The loop made by tying together two maguey strands with two square knots, or the loop of bast fiber cord tied with a square knot, might have been some sort of a carrying device. Three pieces of string of two Z-twist yarns were found tangled together. This could have been part of a net bag used for bringing in vegetable material, or a well-ventilated garment of clothing.

Only two chips occurred in the refuse, so there is little evidence that they did much flint knapping during their stay. The 8 cut *Agave* leaves, the pieces of string, and the possible net bag may be considered evidence of weaving, and the atlatl shaft, 2 pieces of wood, and 2 pieces of bark show that they did do some

woodworking. The discoidal end-scaper and scraper-planes could have been used to work skins. Plotting the artifacts and refuse revealed little of significance except that all the corn and quids were in the east part of the floor and most of the rabbit bones were to the west.

The scraper-planes, the stone bowl, the crude blade with the prepared striking platform, and the large amount of wild corn allow one tentatively to consider Floor 4 as a Coxcatlan Phase component. The Carbon-14 date of 4150 B.C. \pm 200 (I-573) tends to confirm this otherwise poorly documented classification (*Radio-carbon* 11: 96).

The Way of Life of Zone D

On top of Floor 4 of Zone E was another 20-cm.-thick stratum of flakes of yellow rockfall that was capped by a thin stratum of charcoal, preserved vegetal material, refuse, and artifacts, designated as Floor 3. The floor itself extended from N1, N2E1, and S1W2 to about W6. In total it covered 28 to 32 square meters. In the east half of this area the floor was composed of patches of vegetal material, ash, and charcoal and overlaid the rock fill of Zone D. West of the W4 axis it became a thin line of ash (5 cm. thick) on top of or almost on top of the rock floor of the cave. In this west half at N1W5 there was one patch of charcoal about 50 cm. in diameter. In the east charcoal was more prevalent, and the layer varied from 2 to 8 cm. in thickness. Along the N1 axis at N1W2.5, N1.8 and N1E1.8 were three small areas about 30 cm. in diameter where charcoal and vegetal materials were a little thicker than elsewhere. Later we also noticed, when we examined the profiles and sample bags, that the latter two of these contained considerable amounts of fire-cracked roof fall and fire-cracked river pebbles. Though they are far from being well defined, we believe the four burnt areas must be considered hearths.

On the basis of the evidence of the four hearths and the extent of the floor it is possible that the floor was laid down either by a macroband of 3 to 4 families in a single season or by a single small group who returned to the cave on four or five occasions not long separated in time and lived in slightly different places. A third hypothesis is that a single microband lived in the cave initially and later became a macroband. As shall be seen, we suspect the latter to be the case. The hearths are fairly far apart from each other. Furthermore, two broken pieces of the same scraper-plane were found on opposite ends of the floor, and all the spring pochotes were found around the westernmost hearth. The preserved vegetal material suggests that the occu-

pation in the cave began in the spring and lasted until the early part of the summer wet season. There were 5 pochote pods, ripe in March, *Leucaena* pods, grass seeds and quids, ripe in June, and an *Opuntia* leaf, as well as 114 corn fragments and black sapote (remains in the feces), ripe in August or September. Further, the bones included those of turtle and lizard, wet season animals. The total amount of food represented is not large and certainly does not seem to have been enough for a macroband over such a long period. It is possible that either the larger amounts of food necessary for such an occupation were not preserved, or that the occupants were relatively cleanly and threw much of their garbage out of the cave. However, as suggested, we believe that a series of microbands joined an initial microband late in the wet season, thereby constituting a macroband occupation.

Be that as it may, some sort of group stayed from the spring to the rainy season and for some of this period, if not all, a macroband was living in the cave. Found in the refuse were bones of at least 3 rabbits, a skunk, a turtle, a lizard, and a dove. This has been calculated as representing about 5.3 liters of meat. One hundred sixty-one *Agave* quids, 1 *Opuntia* leaf, 4 huaje pods, 5 pochote pods, an ounce of grass seed and 7 grass quids, and 43 wild corn cobs indicate that plant collecting accounted for an estimated 17.7 liters of food. Thirty-two early cultivated cobs, one early tripsacoid cob, and about 9 corn quids have been calculated as representing 3.2 liters of food. Thus, the food remains may be more accurately figured as representing 68 percent from wild plant remains, 12 percent from agricultural produce, and about 20 percent from meat. It must also be added that 72 out of the 161 *Agave* quids occurred around the fireplace at N1W5, and many of these were burned. These may also be considered to have been baked food, and if so, then the wild plant collecting aspect of their diet was even higher.

The one human feces (Cop. No. 3) gives a similar picture for it had mainly *Opuntia* leaf particles and meat in it, along with grass leaves and maguey tissue. Much of these remains were burned, suggesting roasting. Also present and supplementing other refuse data were black sapote tissue, another domesticated plant consumed. Coprolite No. 4 was from an animal that seemed to have consumed mainly cottontail rabbits, although a human hair was present.

The majority of the artifacts that were uncovered can be connected with their subsistence activities. The one wooden atlatl foreshaft fragment and the broken projectile point tip could have been used for hunting

game. A piece of stick with a maguey strand tied around one end of it was perhaps a piece of a snare or simple spring trap. With this they could have caught the rabbits and skunk. Since all the animals found in Floor 3 were small, it is assumed that they were butchered in the cave. Side-blade knives with the 2 crude blades in them or the 3 fine obsidian blades with no prepared striking platforms or the 7 thin side-scrapers could have served to slice up the meat. There was also 1 chopper fragment, a blocky core chopper, and a large bifacial disk that could have been used to crack up the bones. However, none of the bones showed evidence of interior scraping for marrow; almost all were small and could have been easily snapped with the hand. It seems more probable that the choppers were used for smashing up plants. Further, the scraper-planes, 2 multi-faceted, 2 domed, 1 flat-topped and a fragment, may have been used for pulping *Agave* and *Opuntia* leaves and such. One piece of maguey fiber, S-twisted bast yarns with loops in them made by a square knot, and an S-twisted *Agave* yarn with a slip knot loop in it may have been used for carrying plants into the cave. The majority of the bones were found around the fire hearth at N1W5; many of the small splinters were burned. Further, around the hearth at N1W2.5 were the majority of the burned *Agave* quids and leaves. Thus it seems probable that much of the food was roasted over the embers of these two fires. This is in agreement with the evidence of cooking found in Coprolite No. 3. Most of the corn cobs and *Agave* quids occurred in Squares 0-0 and W1 and seemed to have been eaten raw. The muller fragment may have been used to grind the grass seeds.

While there were only a few bundles of animal hair and while the evidence suggests only a few animals were killed, there was a disproportionately large number of end- and side-scrapers which could have been used to work skins. There were 2 thin crude flake end-scrapers, two domed scraper-planes, one flat-topped scraper-plane, two multi-faceted scraper-planes, a fragment of a scraper-plane, and 1 crude discoidal scraper. All of these, if they were used for scraping, would have been held in the hand. The 2 thin flake end-scrapers, the 7 side-scrapers, and the obsidian blade, of course, might have been hafted.

Evidence for the manufacture of flint tools during this time is extremely poor, for only 51 flakes were found in the refuse, though there were a number of complete artifacts. Again, one cannot help but wonder if the artifacts were not manufactured elsewhere and brought in and used and lost in the cave. There seems to have been one minor difference in their flint-knap-

ping techniques, which is concerned with the polyhedral cores and the making of crude blades. The conical polyhedral cores with the parallel fluted sides usually had their striking platforms notched or chipped before blades were struck from them.

Four pieces of S-twisted and one piece of Z-twisted yarn of maguey fibers were found in the refuse and probably were made during their occupation. One of these was tied with a square knot and one with a slip knot. There was also a piece of S-twisted bast yarn and an *Agave* strand, both tied with square knots to make loops. One flattened, pointed stick might have been a weaving tool for making baskets, but, if so, we found none of the end products. Woodworking was indicated by the whittled weaving tool, 4 polished stakes, 4 whittled sticks, and a ground atlatl dart foreshaft fragment. There were also a number of pieces of sticks (about 6 of the 24 sticks found) that had had their barks sliced off them. The 2 flint gouges and the side-scrapers and blades may have been the tools for this activity.

The feces found in this layer came from right in the middle of the greatest concentration of corn and *Agave* quids. Evidently these people had none of the sanitary refinements of the later Palo Blanco occupants.

The flake end-scraper, the fine obsidian blades (one without a prepared striking platform), the many early cultivated corn cobs and one tripsacoid corn cob, as well as many of the other artifacts, clearly allow the material remains of Floor 3 to be classified in the Abejas Phase. The date of 3300 B.C. \pm 250 (I-659) is in full agreement with the classification (*Radiocarbon* 11: 96).

The Way of Life of Lower Zone C

Covering Floor 3 and Zone D was another 20-cm.-thick stratum of loose rockfall. In Squares 0-0 and W1 of the cave, however, the zone contained considerable refuse and artifacts. The horizontal distribution makes one suspect this was either some sort of indiscernible pit of refuse from one or more occupations, or so casual a group of visits that no discernible floor was laid down. Either way, it must have been by a very small group for a very short period or periods. Although there were no significant area distributions, the plant remains hint that there were at least two brief periods of occupation—one in the spring when the *Leucaena* pods, grass quids, cactus seeds, mesquite pods and seeds, and pochote pods and roots were consumed, and the other near the end of the rainy season when the corn on the cob, pumpkin, and black sapote were eaten. In terms of diet, this would probably mean, in

the early visit, one primarily of wild plants and, in the later sojourn, one mainly of agricultural produce. The rabbit would have been trapped at any time and the *Agave* could have been plucked in any season.

Most of their tools seemed to be connected with their subsistence or food-preparation activities. All-purpose cutting and chopping tools would have been the crude blade, the fine blade, the 2 thin side-scrapers with one edge retouched, the utilized thick side-scraper, the small and the large chipped disk, the 7 bifaces, the 2 flake choppers and the 2 chopper fragments. The crude discoidal scraper, 2 long flake end-scrapers, and 2 scraper-planes could have been used to flesh plants. The maguey strand tied into a loop by a square knot and the overhand knot of bast fibers may have been parts of carrying-loops. The blunted atlatl foreshaft was part of a hunting tool and the flat and round pointed sticks could have been parts of small planting sticks.

The limited number of artifacts makes it difficult to classify this archaeological component. Only the 1 fine obsidian blade with a pointed striking platform is of much help. This artifact hints at an occupation in the general period of the Formative and in the Tehuacan Valley this would mean either Ajalpan or Santa Maria. The corn, however, while not exactly an artifact, is more useful. Predominantly, this corn was early tripsacoid (86 cobs) with some primitive Nal-Tel-Chapalote cobs (8). This again speaks for a Formative Period occupancy. However, associated with these tripsacoids were 30 wild cobs and 38 early cultivated cobs. This would mean the early Formative and therefore Ajalpan times. The complete lack of pottery in a Formative Period occupation is most strange, but again, the time in which they deposited these materials may have been an extremely brief one during which they came only to plant and to harvest and did not feel the need to drag some pots along with them. The Carbon-14 date of 1025 B.C. \pm 200 (I-566) (*Radio-carbon* 11: 96) points to an Ajalpan occupation. Thus, we believe tentatively that Lower C's materials were deposited by Ajalpan peoples, even though the evidence is not overwhelming.

The Way of Life of Zone C¹

Capping the fine rock of Lower Zone C was Floor 2, which was actually the top of Zone C. This floor encompassed an area from N1E3, N2, S1W2, and W3—about 12 square meters in total. It was never over 5 cm. in thickness, and contained a single patch of charcoal about 5 cm. thick and 30 cm. in diameter in its east end. The floor was mainly composed of gray ash, al-

though some patches of vegetal material occurred. The size of the floor and its single fireplace suggest that it was never occupied by more than one family or more than one small group of corn farmers. The plant remains, mainly pochote pods, *Leucaena*, *Acacia*, and mesquite pods and grass quids and seeds, indicate that the occupation took place somewhere between March and about June. The tomatoes and particularly the corn tassels seemed to show that the occupation endured well into the rainy season. The relative thinness of the floor may indicate that it was only occupied from two to five weeks during this period of time. In fact, it might well be that this occupation represents a group who came and picked the corn planted on the terrace in front of the cave, or two groups, one who came to plant and the other to harvest.

The plant and animal remains give us a glimpse of their diet during this brief stay or stays. Most of their food, about 52 percent, came from agricultural plants (134 corn cobs and 28 tomato skins). None of the glumes of the cobs were broken or cut so the corn was not shucked, but rather eaten direct from the cob. One sherd shows some burned food on its interior, and there is the possibility that the corn and tomatoes were boiled. These agricultural plant remains were estimated as composing about 7.9 liters of food.

Wild food plants were slightly less popular. There were a large number of mesquite pods (57), *Agave* (123) and soft grass (49) quids, 11 pochote, 3 *Acacia*, and 24 *Leucaena* pods, 1 chewed *Ceiba* root, and 202 grass seeds. All told, these only compose 4.7 liters of food, or 31 percent of the total food, and probably none of it was overly nutritious.

Animal bones were not very prominent among the remains. They came from 1 fox and 2 rabbits, and, if the rabbits were very fat, perhaps 3 liters of food would have been obtained from these mammals, only about 17 percent of the total foodstuffs.

Most of the chipped artifacts are all-purpose chipping and cutting tools, 2 thin flake side-scrapers with one edge retouched and 2 thick side-scrapers, one with one edge retouched and the other with one edge utilized, a spokeshave, a flake chopper and a blocky core chopper. These implements were probably made in the cave as they were associated with 76 chips; both the chips and artifacts seemed to be derived from the brownish local chalcedony found in San Marcos cliffs. One of the side-scrapers and 9 of the chips had adhering prepared striking platforms. This suggests that most of the tools were derived from flakes struck from prepared blocky cores by percussion blows and only the 2 thin scrapers, 1 thick side-scraper, and the spoke-

shave were further worked by unifacial pressure-retouch.

One of their other activities during their stay or stays was string-making and the tying of string. Many (1059) cut *Agave* leaves as well as 282 oz. of *Agave* strands and 123 *Agave* quids occurred. One of the *Agave* strands had been tied into loops; one end by a granny knot and the other by a two half-hitch knot. These loops may have been used for carrying things into the cave. Also, some of the (chewed) *Agave* strands had been S-twisted to form yarns and then 2 of the yarns had been Z-twisted to form a cord. Seemingly more popular than string of *Agave* was string of bast fibers, that is, bark or pochote cotton that was abundant throughout the floor. Two strands of bast fiber were tied with square knots, while one had an overhand knot and another a slip knot. The latter could have served as part of a snare, but probably all were parts of carrying-loops. Another carrying-loop tied by a square knot was from Z-twisted cord composed of two S-twisted yarns; a single strand of S-twisted cord of Z-twisted yarns was also uncovered. Also found was one Z-twisted yarn of cotton, probably made on a spindle whorl, and a Z-twisted cord of 2 S-twisted cotton yarns, probably made by hand. The lack of cotton fibers or balls in the cave made us suspect that these were made elsewhere.

Besides these artifacts, 19 sherds were uncovered that were also manufactured elsewhere, but brought into the cave and lost. The 4 sherds of El Riego Orange and the 2 of El Riego Gray seemed to be from a hemispherical and a ring-based bowl respectively, both of which had been cooked in. The El Riego Plain, 1 El Riego Polished, and 3 sherds of Quachilco Mica did not have rim sherds, nor were they burned, suggesting that these types were used for storage vessels (3 ollas).

The sherd types suggest that Floor 2 was a Palo Blanco component at about 200 A.D.

The Way of Life of Zone B

Refuse and rock fill extended from the west edge of the cave almost to the east end from E1 to W9. It covered an area of roughly 54 square meters. In thickness it was about 5 to 10 cm. in the east end, while it reached about 40 cm. in W6, in total about 10.2 cm. of refuse. Extending down from the floor were two depressions about 20 cm. deep, 60 cm. in diameter, with their centers at roughly N.5W3 and S.6W5.4. These probably represented refuse pits. A much more definite pit, a meter in diameter and 66 cm. deep, occurred in Square S1W4. While the refuse covered this wider area only a small part of it had a deeply

packed down charcoal floor. This compact layer of charcoal and vegetable material from 1 to 5 cm. in thickness was discernible in an area encompassed by N1E3, S2W3, and W5 where it overlay the rockfall layer of Zone B. This compact layer was not discernible beyond W5, perhaps due to soil leaching, for to the west, Floor 1 became a thick dark layer with no rockfall underneath. One area in N1W6 had not only more charcoal but also burned yellow rock beneath—perhaps a fire hearth. Two other small features extended down from Floor 1 into the lower parts of Zone B and there is little doubt that these were definite hearths. One was a small firepit full of ash, about 15 cm. deep and 40 cm. in diameter with its center just under the stake S1W4; the other was about a meter in diameter and 60 cm. deep with its center at about N1.5. This latter depression or hearth was filled with large chunks of carbon, burned *Agave* leaves, and fire-cracked rock. This fairly noticeable charcoal floor area covered only about 25 to 30 square meters.

Now what does this raw data concerning Floor 1 and Zone B mean in terms of culture? Obviously, the limited area and the 3 fires and 3 refuse pits mean that the population in the cave was small and the thickness of refuse seems to mean that the occupation was a short one. This is somewhat confirmed by the analysis of the plant remains. The pochote pods which flower in March indicate that this occupancy began at that time. The various pods of *Acacia*, *Leucaena*, and *Mimosa*, *Amaranth*, and grass remains show that the occupation continued into May and June, while the single examples of cosahuico and chupandilla fruits and 3 *Casimiroa Edulis* fruits (ripe in August and September) indicate the occupation lasted to that time. Though there is evidence on the terrace below that people used irrigation methods, the corn, squash, and tomatoes are wet-season plants. Bones of lizard, snake, and mud turtle were found, all of which, as far as San Marcos Canyon is concerned, could only have been collected in the wet season. Thus there is little doubt that Floor 1 was laid down roughly between the months of March and August. The relatively limited area of refuse and the evidence of 3 fireplaces seem to show that the occupation during this period was by no more than three or four families. Of course, it could have been a single family living in three different parts of the cave with three fireplaces.

The way of life and the subsistence pattern of these seasonal occupants of the caves represent but a single facet of their culture. However, enough foodstuffs and feces were preserved so that we get a fairly clear picture of their subsistence activities. A large part of

the diet of these inhabitants came from animals. At least 1 deer, 1 peccary, 4 cottontails, a gopher, a snake, a lizard, a turtle, and 3 birds were killed by the inhabitants of Floor 1. It is estimated that these remains represent about 35 liters of meat. There were also the bones of a dog. One of the bones was burned, and we assumed that this domesticated animal was eaten, representing perhaps 2 liters of meat. A larger amount of produce came from agriculture. We found the remains of at least two different squashes (*Cucurbita pepo* and *C. crescentia*), as well as 5 oz. of amaranth, 3 sapote blanco pits, representing at least 2 sapotes, and 25 dehydrated jitomate skins. However, the most important food by far was corn, 447 cobs represented, as well as a number of leaf, stem, and tassel fragments. All told, this agricultural produce represented about 46.3 liters of food.

Wild plants of a number of varieties represented 11.6 liters of food. The more important of these foods were various kinds of (chewed) *Agave* leaves, *Opuntia* leaves, pochote pods and various kinds of huaje pods and seeds. More data on their diet was also revealed by an analysis of 7 human feces. Two (Nos. 88, 90) had only the remains of a meal based mainly on *Agave* (80 percent) and meat, and one of them had a meal based only on *Agave*. Three (Nos. 6, 12, 92) showed a better balanced diet with a little agricultural produce, some wild plants, and some animal remains. One (No. 87) showed agricultural produce (tomatoes) as well as cactus. By averaging out the content of each of these feces, we see that the majority of their food was from wild plants, some from animals, and only a little from agricultural produce. This estimate is somewhat different from that reached on the basis of studying the garbage remains, which showed that slightly over 37 percent was from animal remains, 50 percent from cultivated plants, and 13 percent from wild plants. Realizing that many of the agricultural plants and fruits would be better digested than the rougher wild plant fibers, it would seem that the estimate from the refuse is probably more accurate than that from the human feces. Thus, during their stay (a small group from one to four families from April to August), it would seem that they lived primarily off agricultural produce, and only incidentally off wild plants, with little or no meat. This occupation may have been by a family or a small group of families who came to the terrace to engage in agriculture. These families may have brought some small amounts of food with them when they first arrived; however, they would have, for the most part, collected wild plant foods and eaten some meat. In the middle of

their stay the amount of wild plant foods would have decreased, and meat and some agricultural produce (such as *Amaranth*) increased, while in the final months during the harvest the agricultural foods would have been predominant.

The bones of the deer and peccary and the Morhiss point that was lashed to an atlatl dart or lance may indicate atlatl hunting. The 4 cottontails, the gopher, and perhaps the birds could have been caught with the snare, for we found one actual snare part as well as 21 nooses made by slip knots of *Agave* that could have been attached to traps. The snake, lizard, and turtle could have been killed by a quick twist of the wrist or a well-aimed rock. Artifactual evidence of agriculture or plant collecting is difficult to discern, but the 3 pointed sticks and the 2 flat slabs could have been digging-sticks used in these processes. Sherds of roughly Floor 1 times found in association with a series of parallel lines of rock on the natural terrace in front of the cave strongly suggest that the corn was grown on irrigated terraces. The height of the irrigation terraces above the arroyo bed also suggests that the area was watered from the dam upstream from the cave.

Any of the above-mentioned foods could have been brought into the cave in the split-stitch basket or in 9 tight-carrying or 21 slip-carrying loops. Harvesting, cutting, crushing, and chopping the foodstuffs could have been accomplished by the all-purpose tools, such as the 3 fine blades, the 19 crude blades, the 26 thin side-scrapers, the 10 thick side-scrapers, the 2 bifaces, or the 8 choppers. *Opuntia* and *Agave* leaves could have been scraped by the 14 scraper-planes. Both the burned meat and *Agave* leaf particles in the feces indicate that these were roasted. This cooking method is confirmed by the 61 burned *Agave* leaves around the fire hearth, filled with ash. Also, the glumes of 14 corn cobs were charred, and around the 3 rock-filled hearths we uncovered a number of burned bones. Few bones show evidence of splitting or interior scraping, so marrow does not seem a major item in their diet. Most of the glumes—226 early tripsacoid, 123 Nal-Tel-Chapalote, 93 late tripsacoid, 2 Zapalote Chico cobs—show evidence of cutting, suggesting that the kernels were cut off the cobs. This was evidently done to obtain kernels for cooking or for shipping back to the permanent homes of the cave dwellers and not for making tortillas. Some of the corn, as well as the other foods, may have been boiled in bowls; sherds of El Riego Polished and El Riego Black, which were probably originally 2 hemispherical bowls, as well as an out-sloping-rim bowl of El Riego Gray, had adhering

carbon. The reconstructed hemispherical bowls, the barrel-neck olla, the incurved-rim bowl, and the cylindrical jar of El Riego Gray, the two possible bowls of Thin Orange, the possible bowl of El Riego Marble-tempered, the short-flaring-rim olla of El Riego Plain, and the possible ollas of El Riego Orange and Quachilco Mica could have been used for storage or as eating receptacles. The 3 sherds of Coxcatlan Brushed and 3 local sherds of San Martin Incised may have been decorative wares.

One of the more important activities other than the food quest was manufacturing chipped-stone tools. Four hundred thirty-three chips and 103 chipped-stone tools were uncovered. Two or possibly 3 basic techniques were employed. One method, either for obtaining flakes or for making tools, was the blocky-core technique. Here a block of flint, usually from the strata of flint found in the cave walls or a split river-pebble, was chosen. Then one flat surface at right angles to a side was used as a striking platform, either with (18 examples) or without (37) preparation, and a series of flakes was struck off it from the side adjacent to the striking platform by percussion blows. Some of the 2 multi-faceted and 5 domed scraper-planes and 6 blocky-core choppers may have been cores used in this technique. Other scraper-planes such as the 5 flat-topped, 1 crude discoidal, 1 gouge, and 2 scraper-plane fragments may have been originally such cores but were further retouched for use as pulpers. Many of the so-called 6 thin flake end-scrapers, 36 side-scrapers, the 2 gravers, 2 spokeshaves, and 19 crude blade fragments initially were made from flakes struck off from cores of this type. Further, a few of the bifacial blades may originally have been large flakes from this type of core that later were percussion and pressure flaked bifacially. This is the second technique; that is, working a large nodular flake first by bifacial percussion flaking. Many of the choppers of the discoidal and ellipsoidal varieties were made in such a manner. Other implements such as the projectile point, ovoid bifacial knives, and fine flat-topped end-scrapers, after they were first bifacially percussion-flaked, were then bifacially pressure-flaked. The third technique was of more limited use. In this technique a block of flint or obsidian was chosen with a cortex or ground or unprepared striking platform at right angles to its adjacent sides. Then, by careful indirect percussion-flaking, parallel flakes were removed all around its sides, resulting in a cylindrical, polyhedral nucleus. The resultant flakes from such a core were the 5 fine prismatic blades. Most of the material chosen for initial cores seems to have been of local origin

except for the cylindrical cores, and here obsidian was brought in from some adjacent region. Tools used in flint knapping were rare in the cave. A small elliptical pebble hammerstone may have been used for some of the percussion-flakings, and a single piece of cut antler tine may have been employed in pressure-flaking.

A second major industry during the cave's final occupation was weaving. The basic materials used were *Agave* leaves, bark, and cotton, all of which were on the floor. The *Agave* leaves (we found 182) may have been cut by end- or side-hafted knives and then sliced into small strands. About 150 strands and 1 coiled strand were found in the refuse, distributed randomly over the floor. 31 of them had knots (118 overhand, 20 slip, 2 square knots, 1 with 2 half-hitch knots, and 1 granny knot) showing that they were used as "string or yarn." One simple twilled petate was also woven from wider (1 cm.) *Agave* strands. Thinner maguey fibers were also used in stitching the one fragment of basket we found. This basket was originally washing-pan-shaped and was composed of coils and bundles of grass about $\frac{1}{2}$ cm. in diameter which had been split-stitched together with rather narrow *Agave* strands. This basket evidently was made of two grass coils at a time; these were stitched first by looping one strand round and round the grass coils, then a second strand was wound around one of the second coils and inserted through a slit, cut in the strands of the first coils. This second strand in turn was looped onto a third bundle of grass and a fourth set of coils were woven together by *Agave* strands that went through the second set. In such a manner the whole basket was built up. These strands were wound in an S-twist manner, that is, sloping from upper left downward to lower right. In the excavation we found no tools that could have been used in making the baskets or the petates.

The second use of the maguey leaves or strands was in making true pieces of string. The strands, after being cut off the leaves, were softened. One cannot help but wonder if the many chewed quids were not secondarily involved in the softening of maguey fibers for making string. The individual (wet) fibers were then usually (22 specimens) twisted (S) clockwise to form a yarn. Perhaps if they were right-handed they did this by rolling the wet fiber down the right thigh with the right hand. A few yarns (10) were, however, counter-clockwise (Z) twisted, perhaps manufactured by rolling the strands up the right leg or thigh. Most of the resultant yarns were between 1 and 3 mm. in diameter. The majority of them (all but 2 pieces) were then made into Z-twist cord, there being 12 pieces of Z-twist string and 4 of S-twist. Two of these

were tied together and also attached to two small Z-twist pieces of string. This latter specimen may have been the strap part of a piece of sandal. One other piece of Z-twist string was tied into a slip knot, and still another into an overhand knot. Other string was made from bast fiber from either pochote cotton or bark. One strand of bast fiber had an overhand knot in it while 2 had been Z-twisted to form yarns. Also, two S-twisted yarns had been Z-twisted forming a cord, and there were 4 S-twisted cords. All these cords had square knots forming loops tied in them.

Besides the bast and maguey string and yarn were cotton yarns and string. Most of the yarn occurred in two small bundles of cotton near the center of the excavation. There also were two pieces of woven cotton cloth. All this yarn in the textile as well as 8 specimens was Z-twist and was probably made by use of the spindle whorl. However, two pieces of string of two S-twisted yarns and 2 S-twisted cords occurred. These looked hand-made and further, the texture was sufficiently different to suggest that it was not true cotton, but some sort of wood cotton. Further, the ends of these latter strings were tied with overhand knots, perhaps to keep the string from unraveling. This, of course, is not necessary with true cotton yarn.

Two pieces of cotton textiles were made from Z-twist yarn. These were a simple one-over-one weave and were probably woven on a belt loom. One was a fragment from a large piece while the other was a narrow piece of fabric with two parallel selvages. Perhaps this latter was some sort of belt or sash. Besides these there was one tiny fragment of a one-over-one weave textile made from S-twisted *Agave* yarns. All the above were made on a belt loom and perhaps were made in the cave, for the 2 cut wood slabs could very well have been parts of heddles.

Leather-working is an industry that probably occurred during the cave's occupancy, although we have none of the end products. Scattered tufts of deer hair appeared to have been shaved from a hide and the end-scrapers were probably the tools. The skins initially separated from the animal's body were tailored by either the 36 flake side-scrapers, the 6 thin bifaces, or the 24 blades. The fatty tissues could have been scraped off the hide, either by the 14 scraper-planes or by the 6 thin flake end-scrapers, the discoidal scraper or the 1 finely chipped end-scraper, or all of these. The scraper-planes were probably held in the hand, while the other end-scrapers might have been hafted. The 2 flake graters also could have been used in tailoring leather. Exactly what the leather was used for is unknown.

Four shaved sticks, one snare, cut and grooved, 2 cut slabs, 2 pointed slab sticks, and one round pointed stick were tools made in an apparent woodworking activity. Sticks could have been cut by the side-hafted knives or side-scrapers, while a gouge or the 2 spoke-shaves could have been used to peel off the bark.

Some of the time during their occupancy was used in digging the three pits. Some of the pieces of flattened sticks could have served as shovels or digging tools. The exact use of the 2 smallest pits is unknown, but the larger one was definitely used in part for storage of corn, since it had 175 corn cobs in it.

Though all the refuse materials were plotted on a floor plan map, except for the corn and bark cloth, only 2 other kinds of remains showed any significant distribution. Sixty-one of the *Agave* leaves, partially burned, all appeared around the fire hearth filled with ash, while all of the 12 feces were in back of the large refuse pit near the wall of the cave where one could not stand up.

Other activities may have taken place in special spots in the cave but our evidence for them is not obvious.

In terms of archaeological relationships, the remains of these people found in Floor 1 of Zone B can be definitely classified as Palo Blanco. The Morhiss point, the dominance of El Riego Gray potsherds, and the presence of some Thin Orange, as well as a fine blade with two edges worked and a fine blade with a ground striking platform, all justify this classification. Further, the blade with a ground striking platform and the Thin Orange pottery would place it in the middle or late part of this phase. The Carbon-14 date of 300 A.D. \pm 130 (I-657) is in full agreement with this conclusion (*Radiocarbon* 11: 96).

Tecorral Cave

Tecorral Cave is small and triangular in shape, roughly 8 meters wide and 6 meters deep. We found the cave about six meters west along the base of the same cliff that sheltered San Marcos Cave. During February, 1962, while we were digging San Marcos, we made our initial test, an east-west trench about 4 meters long, 1 meter deep, and 1 meter wide. It extended from the mouth of the cave to the interior west wall roughly parallel to the south wall. We studied the profiles, analyzed the meager remains uncovered, and decided to excavate the whole shelter in the hope of finding more preserved foodstuffs of both earlier and later vintage than those uncovered in Tc 254. Later excavations were conducted by Angel Garcia Cook. Angel extended the westernmost square of the initial

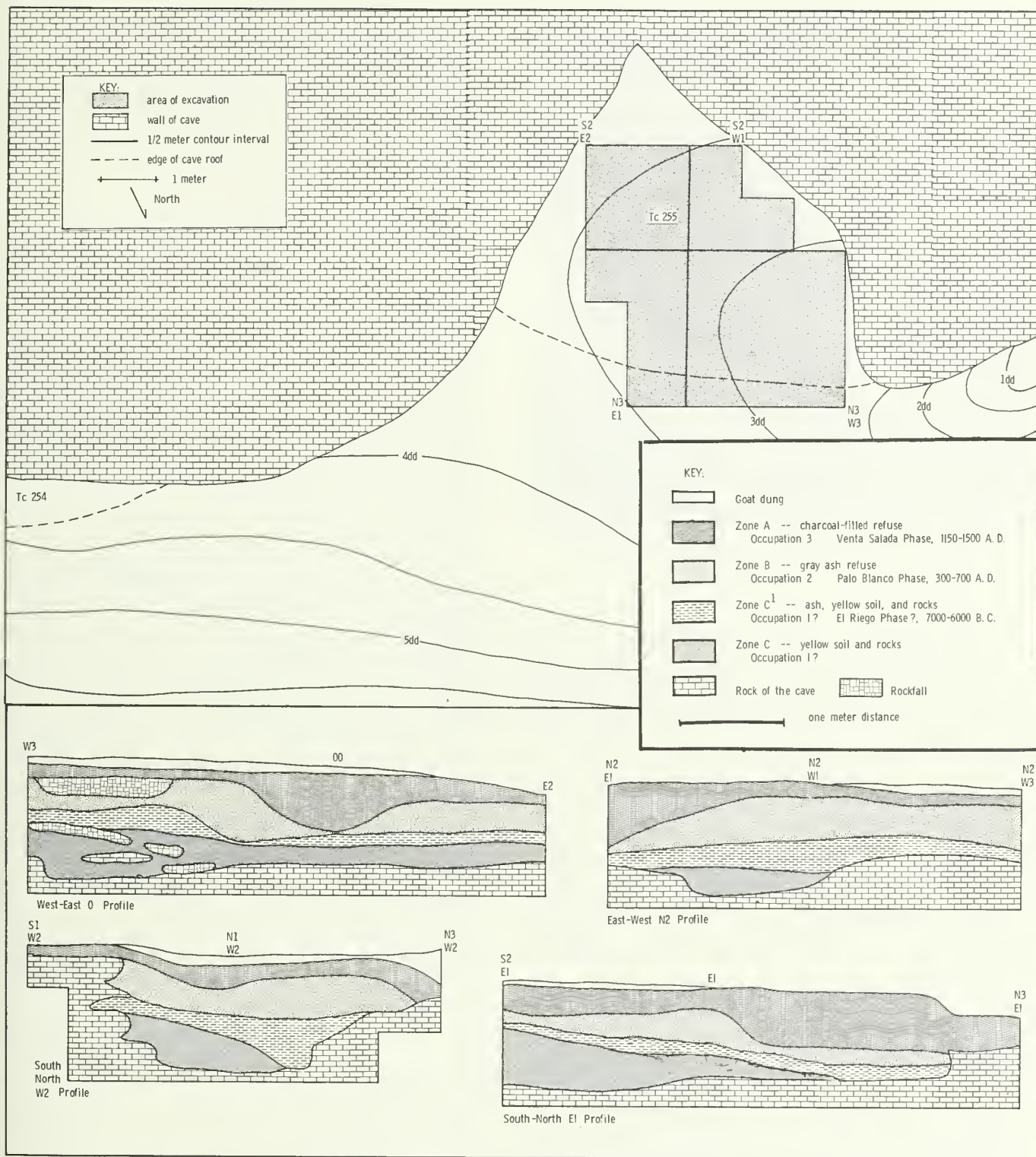


TABLE 6

Sequence in Tecorral Cave (Tc 255)

Occupation 3	Zone A	Venta Salada Phase, 1150–1500 A.D.
Occupation 2	Zone B	Palo Blanco Phase, 300–700 A.D.
Occupation 1 ?	Zone C ¹	El Riego Phase, 7000–6000 B.C.



Fig. 59. Excavation in the northwest part of Tc 255.

east-west trench across the mouth of the cave northward 3 meters. This gave him a long L-shaped profile of the deposits of the cave (Fig. 58). By stripping off in alternate squares each zone from the west wall of the north-south trench, he continued the excavation until he reached the back wall of the cave.

The stratigraphy of the cave was not complex. Overlying the rock floor was a layer (Zone C) 20 to 60 cm. thick made up of roof fall, large rocks, yellow soil (aeolium?), and refuse. There were no discernible floors within or on Zone C, although the middle portion in the south side of the cave contained a slightly higher concentration of grayish ash (Zone C¹). Overlying this was gray ash and charcoal of Zone B only about 10 cm. thick. Above it was Zone A, about 20 cm. thick, composed of flakes of roof fall and silty soils interspersed with charcoal, artifacts, and preserved vegetal remains, capped with goat dung.

Our reconstructions of Zones C, B, and A do not include the floor plots used to illustrate other more complex floors of other caves. Tecorral is a small cave, and few remains were uncovered. Furthermore, no activity areas were discernible. Nevertheless, what we did find, as described below, agrees with our chronological sequence (see Table 6) and generally recreates the occupation or occupations of the floors.

The Way of Life of Zone C

The lowest zone was relatively thick and did not have any well-defined floor either within or on it. The artifacts, which seemed to be mainly of El Riego types usually associated with modern fauna, were found in conjunction with extinct turtle and antelope. One suspects, then, that the layer was built up over a long period of time and might have been occupied on numerous occasions. Be that as it may, the size of the floor area would seem to indicate that any or all occupations must have been by a microband. Also, the turtles and lizards suggest that some, if not all, of the occupation or occupations were during the wet season.

The animal bones, at least those of the antelope, 2 cottontails, a coyote, a fox, a turtle and a lizard, suggest that one of the activities of the occupants was hunting and trapping. The thin crude ovoid biface could have served as the tip of a lance or spear. The absence of grinding stones would seem to show that they did not grind or perhaps even collect seeds of agricultural produce. Fruits, of course, could have been picked and some of the 7 scraper-planes (2 fragments, 3 domed, 1 flat-topped and 1 multi-faceted) could have been used to scrape leafy plants among other things. Other tools, such as the choppers (1 fragment, the slab chopper, the ellipsoidal chopper, and the 8 blocky-core choppers), the San Nicolas burin, the 8 blades and the 13 side-scrapers could have been used to butcher and prepare for eating the various animals hunted or killed.

Besides these evidences of subsistence activities there was abundant evidence of flint knapping during these stays in the cave—74 chips, 7 of which had prepared platforms and 5 of which had unprepared ones, various flint tools including 2 thin flake end-scrapers with prepared platforms, 3 thin side-scrapers with prepared platforms, 4 crude blades with prepared platforms, 1 conical polyhedral core with a prepared platform, the blocky-core choppers and multi-faceted scraper-planes with prepared platforms, the 3 hemiconical polyhedral cores with unprepared platforms, a thick side-scraper with an unprepared platform, 3 pebble hammerstones and 1 spherical battered pebble. On the basis of the adhering cortexes on many chips,

the materials used seem to have been mainly pebbles. Initially, these pebbles must have been split in half; the broken surface usually but not always after preparation became a striking platform. These platforms seem to have been struck by pebbles or spherical battered pebble hammers. Most were struck rather irregularly, but at least 4 were struck more carefully by a series of parallel blows, forming conical fluted cores for removing at least 8 blades from their sides. One long flake also had been rather skillfully struck from above into a burin. The blades had been used seemingly without further work, as had 3 thin and 5 thick flakes. Also, some of the split pebble cores after a few flakes were struck could have served as scraper-planes. Three other thin flakes and two thick flakes had been made into side-scrapers by either blows or crude pressure-retouching on their lateral ventral surfaces, and 2 thin flakes and 9 longer flakes were made into end-scrapers and 2 gouges by similar working on one of their shorter ends. These 16 tools out of the 57 found are the only ones that appeared to have any evidence of pressure-flaking on them, but even this evidence is not convincing. Thirteen bifaces were evidently manufactured by a slightly different technique of percussion-chipping. It seems these were also made from elongated pebbles, but it appears that the pebbles were whittled down by alternating blows on opposite faces and opposite sides until the desired form as chopper or biface was reached. One of these smaller ones that had been more completely chipped on its two surfaces to a more ovoid form may have been a blank for a projectile point or even a crude finished product.

Evidence of other activities was less striking; the 2 gouges could have been used in woodworking, the burin for bone working, and the 2 crude long flakes and 2 thin flake end-scrapers, as well as the scraper-planes, could have been used in working hides.

The majority of the tools and flint technology seemed to be of the sort used by El Riego peoples, but the layer may have contained remains from earlier times—it is not even a good “possible” El Riego component.

The Way of Life of Zone B

Capping all of Zone C was a stratum about 10 cm. thick composed mainly of grayish ash interspersed with pieces of charcoal. Zone B covered about 14 square meters. Extending down from this zone to the rock floor of the cave was a conical pit about a meter in diameter with its center at about W1. This pit was filled with fire-cracked rocks, ash, charcoal, and a few pieces of burned bone. Two charred immature corn cobs in the pit suggested the floor was occupied at

least during the late wet season and the size of the floor suggests a very small group.

The corn cobs offer evidence of agriculture; perhaps the irrigation terraces and dam in front of the cave were still in use. The bones of white-tailed deer, two cottontail rabbits and two gophers probably indicate hunting and trapping. The fine snapped blade, the thin bifacial fragment, the 2 thin side-scrapers with 2 edges retouched and the 3 with one edge retouched, the 5 thick side-scrapers with 1 edge retouched, the 6 chopper fragments, the 6 blocky-core choppers and the 2 discoidal choppers could have been used to butcher these animals as well as harvest the corn (among many other uses). The foodstuffs in the conical pit indicated that some food was roasted on hot rocks; carbon adhering to sherds of El Riego Black and El Riego Marble-tempered suggest some food was cooked in hemispherical or outflaring-rim bowls. The conical bowl of Thin Orange, the hemispherical bowl of El Riego Gray, and the possible bowl of El Riego Orange could have been used to eat from, and the ollas of El Riego Gray, Quachilco Mica, El Riego Plain, and El Riego Polished could have been used for storage.

The only other activity we had much evidence for was hide-working. The fine end-of-blade scrapers, the 6 thin flake end-scrapers, the 2 multi-faceted scraper-planes, the 2 flat-topped scraper-planes, the 3 scraper-plane fragments, the 3 crude long flat-flake end-scrapers, as well as some of the tools mentioned previously, could have been the tools of this trade.

The sherds suggest that Zone B was a Late Palo Blanco component.

The Way of Life of Zone A

Above the ash of Zone B was a thin (5 cm.) layer of fine flake of rock that had scaled off the roof of the cave. It was covered by a floor of charcoal and preserved vegetal remains that was in turn overlain by another 10 cm. of scaly roof fall and goat dung. These layers were designated Zone A. The majority of artifacts, all the vegetal materials, and the bones came from the floor and our reconstruction is of a microband occupation. Their stay (or stays) must have been relatively brief and probably occurred during the wet season (or seasons); there were 3 *Acacia* pods, 6 *Leucaena esculenta* pods, and 8 *Prosopis chilensis* pods that fruit during the late part of the spring (May-June), as well as corn, white sapote, and cucurbits that became edible in late summer.

Although our sample of foodstuffs was not large, it was possible to make estimates of their subsistence. The huaje pods (or the seeds derived from them), the

fragments of 12 *Agave* quids, and the 13 *Opuntia* leaves may have been wild plant foodstuffs comprising about 15 percent of their "overall" diet, that is, their diet during the full length of their stay. Certainly the seeds from the pods and perhaps some of the other plant remains were eaten in the spring season of occupation and probably at that time represented a higher proportion of their diet than later during the harvest stay or stays. The 33 estimated whole cobs of slender pop-type of corn, the 7 cobs of the Nal-Tel-Chapalote complex, the 2 corn quids, the 3 cobs of the early cultivated race of corn, the white sapote, and the *Cucurbita* mixta squash—all agricultural produce—represented about 63 percent of their food. Again, during their spring occupation the proportion of the diet from agricultural produce may have been almost nil, while in the later occupation it may have represented a higher proportion than the overall figure. Their diet of meat from 1 peccary, 2 cottontails, 2 skunks, 1 gopher, and birds represented about 21 percent of their food. This meat came from both hunting and trapping, but the absence of projectile points makes one suspect it was more the latter than the former. The agricultural produce, the result of farming, included white sapote fragments which would have needed a permanent water supply. We suspect that the dam (or a dam) was still in existence in Tecorral Canyon and farming was with the aid of irrigation. The carrying-loop of maguey may have been used to haul in the wild food plants as well as the other food previously mentioned. The 3 fine snapped blades, the 3 fine blade fragments, the 2 fine blades with pointed platforms, the 5 crude blades, the 3 thin side-scrapers (2 with 1 edge retouched and 1 with a single edge utilized), the 8 thick side-scrapers (1 with a single edge retouched, 6 with 1 edge utilized, and 1 with 2 edges utilized), the bifacial fragment, the discoidal chopper, the 2 ellipsoidal choppers, the 5 blocky-core choppers, the flake chopper, and the 6 chopper fragments all may have been used in cutting up and preparing their foodstuffs. Also, one of the domed scraper-planes had the sort of polish on its ventral surface that could have come from scraping fibrous plants, so certainly this tool and perhaps the 2 other domed scraper-planes, the 3 flat-topped scraper-planes, and the single scraper-plane fragment may have been utilized to scrape plants such as the 8 *Agave* leaves and 13 *Opuntia* leaves uncovered on the floor.

We found many corn cobs with their glumes cut off in association with a cuboid mano and parts of 2 comales of El Riego Marble-tempered and parts of possible comales of Coxcatlan Gray and Coxcatlan

Brushed, suggesting that at least some of the corn kernels were ground, soaked, and made into tortillas and baked on comales. Furthermore, none of the vegetal material or bones showed evidence of charring, although (according to the laboratory notes which critically say, "toto quemado") all the sherds were heavily burned or had adhering carbon. This strongly suggests that much of their food was cooked, boiled, or stewed in the 18 reconstructed vessels found in Zone A. These vessels included one outangled-rim and one funnel-necked olla of Quachilco Mica, a short outflaring- and an outangled-neck olla of El Riego Plain, a possible olla of El Riego Gray, and an incurved-rim bowl of Coxcatlan Red-on-orange, a short outflaring-rim olla of El Riego Orange, a conical bowl of Thin Orange, 2 hemispherical bowls (or a hemispherical bowl and a comale), as well as a short outflaring-neck olla and an outangled-neck olla of Coxcatlan Brushed, a possible olla of El Riego Polished, a hemispherical bowl or comale of Coxcatlan Gray and an olla, 2 comales, and an outflaring-rim bowl of El Riego Marble-tempered.

Evidence of activities other than those connected with subsistence was so slight it was difficult to reconstruct with any degree of confidence. Although there were many (57) chipped stone artifacts in the floor, only 7 chips were associated with them, and no hammerstone, so there seems to be little if any evidence for flint-knapping activities.

Although we found 9 sticks and 4 pieces of bark on the floor, there were no tools we could be sure were for woodworking.

The cuboid mano was made of volcanic tufa and obviously manufactured of that material elsewhere and the finished product brought into the cave. The maguey fiber strand with a loop may well have been made by the inhabitants in the cave, but even this is a moot question. Perhaps the only good evidence for other activities is that for hide working, for we did find with the bones of 6 fur-bearing animals (a peccary, 2 cottontails, 2 skunks, and a gopher) quite a number of scrapers which included 2 finely made plano-convex end-scrapers, 3 discoidal scrapers, a thin flake end-scraper, 3 crude large long flat-flake end-scrapers, and blades and scraper-planes previously mentioned.

The percentages of sherd types found in the zone justify classification as a component of the Early Venta Salada Phase.

Other Sites Tested

Tc 256

We tested two other rock shelters in Tecorral Can-

yon, Tc 256 and Tc 257. Tc 256 was discovered about 100 meters downstream and to the north of Tc 254, at the base of the cliff and the top of the talus. The cave was about 6 meters long and about 2 meters deep. The talus, although yielding only a few sherds (El Riego Gray?), was littered all over with chipped flint. For this reason we decided to test the cave. In it we sank a 1-meter test square to a depth of 60 cm. and when no zones or strata were discernible, we dug in 20-cm. arbitrary levels. Each level yielded literally bogs of flint but no artifacts. Much of the flint was large nodules of brown chalcedony from strata in the cliff wall; nevertheless, there were many flakes as well. About 60 of these flakes had adhering striking platforms, only one was pointed and about half of the others were prepared and half were unprepared. On the basis of these flakes, we guessed that the shelter could have housed a chipping station, possibly of El Riego times.

Tc 257

Tc 257 was just as unproductive but the stratigraphy was excellent. The shelter was located about one kilometer upstream from Tc 256 on the east side of the north branch of the canyon, at the base of a 15-meter-high cliff and above a 20-meter-high talus slope. Its maximum depth was about 6 meters, its length about 27 meters, and its maximum height, 8 meters. We sank a 1-meter-wide, 3-meter-long trench across the middle of the cave, then extended the trench from the edge of the talus toward the back wall. Covering the entire floor was a 5-cm.-thick layer of goat dung. Beneath it was a 5-cm.-thick layer of ash, Zone B, containing a number of Late Palo Blanco sherds, obsidian and flint chips, and one corn cob. At a depth of 10 to 20 or 25 cm. was Zone C, a layer of rockfall, which overlay a few patches of ash, Zone D. Zone D revealed squash seeds, flint, and a few identifiable sherds. The next layer, Zone E, was rockfall 25 to 50 or 55 cm. thick and was sterile of human remains. Below Zone E was a layer of dark brown refuse which, for the most part, overlay the rock floor. This stratum, Zone F, contained bone, a few chips, and El Riego Gray sherds. In one spot in the south part of the cave an underlying rock layer, Zone G, extended from 65 cm. down to the rock floor at 80 cm. Two chips were found in Zone G. The lack of artifacts did not justify further excavations.

Tc 7

Another discouraging test was made in Tc 7. This cave is situated south of the canyon in the San Andrés

travertine cliffs, about a half kilometer east of the electric power station. In the cliffs and on the surfaces immediately above and below the cliffs, vegetation is sparse: lechugilla, barrel cactus, yucca, mala mujer, and occasionally *Lemaireocereus* cactus and sotolin thorny bush. The level areas above and below the 100-meter cliffs that have some soils also have a few grasses and an occasional mesquite tree. Animals in the cliffs are scarce: doves, hawks, owls, racerunner lizards, snakes, rats, skunks, and foxes. The flats to the south of the cave, however, have many rabbits and deer and, prehistorically, probably had peccary.

The mouth of Tc 7 was only about 4 meters below the top of the cliff and was 2 meters wide. The cave itself was 2 meters high and had a maximum width of about 8 meters. Its depth from south to north was about 6 meters. In our test we dug a 1-meter-wide, 3-meter-long north-south trench just in from the mouth of the cave. The middle square, dug in 20-cm. arbitrary levels, reached a depth of about 1 meter; the ends of the trench reached depths of only 60 cm. The refuse, a grayish ash filled with travertine boulders, had no discernible zones in it. Although the artifacts were mainly Abejas Phase types, there could have been any number of Preceramic occupations.

Ts 381

Other test excavations were at Ts 381 on the east side of Atexcala Canyon .7 kilometers north of its junction with the Zapotitlan Arroyo and about 2 kilometers west of Chilac. The hills that flank the canyon have the flora and fauna that are typical of the limestone-travertine slopes on the west edge of the valley. This site, however, situated as it is on a high terrace of Atexcala Canyon, had a slightly different ecology. Because water flows in the canyons during much of the rainy season (and even during the dry season there is sub-surface water) many of the terraces are covered with such grasses as *Opuntia* and maguey. Mesquite trees are very thick on the flanks of the terraces. Game is abundant; deer, rabbits, peccary, fox, lizards, turtles, snakes, and birds are prominent here.

Byers and MacNeish found Ts 381 in the spring of 1963. It was a huge site covering about a 200-meter area along the high terrace of the arroyo and extending back from the arroyo about 100 meters. Initially, we bagged all of the many chipped tools found on the entire site; later, after finding a huge pit in a wall of an irrigation canal that cut through the west end of the site, we subdivided the collections. This area was designated Ts 381w and the rest of the site was called Ts 381e (Fig. 60). Surface collection from these two

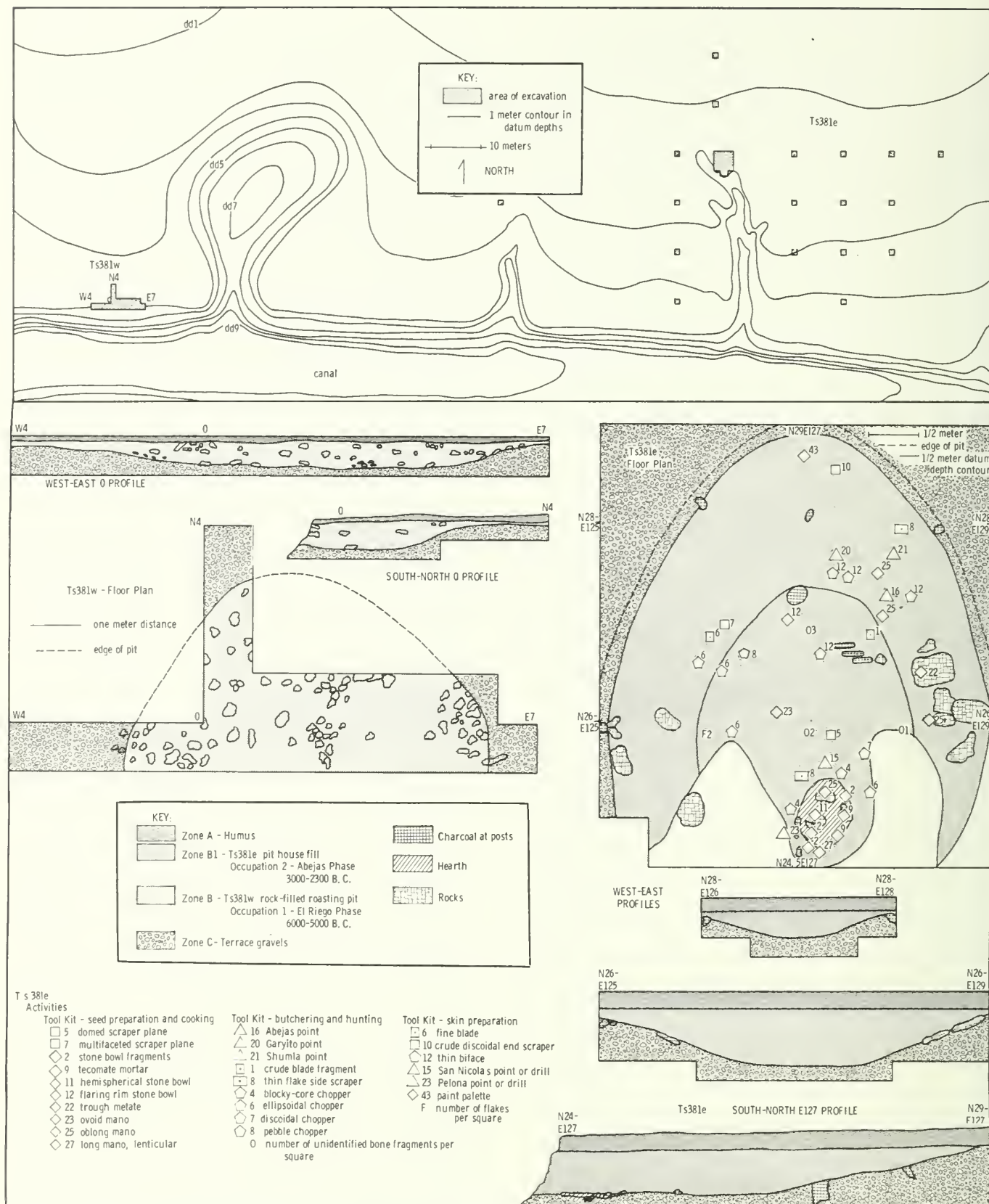


Fig. 60. Contour map of Ts 381w and Ts 381e (top), floor plans and profiles of Ts 381w (middle left), and house plan and profiles of Ts 381e (bottom right), with a key to ecofacts and artifacts.

regions indicated that Ts 381w had mainly El Riego artifacts and Ts 381e had Abejas tools.

On November 22-25, 1963, we decided to test the huge pit cross-sectioned by the canal in Ts 381w. We dug an 11-meter-long east-west trench S1W4 to S1E7 into the north side of the canal bank. This trench extended 1 meter east of the pit and 2 meters west of it. Part of the trench was then extended 1 meter farther north (from N1 to N1E6) and, finally, a 1-meter trench dug northward into Squares N1E1, N2E1, and N3E1 went 1 meter past the north end of the pit. Stratigraphy revealed an overlying layer of gravel and humus (Zone A) about 20 to almost 40 cm. thick. This represented soil that had built up since the occupation and dirt dug from the canal. Underneath it was Zone B, a dark gray to brownish-gray stratum filled with rock which was partly refuse. In the north end, as well as east and west of the pit, this zone was about 20 cm. thick, usually without rocks and more brownish-gray. In the pit Zone B was darker in color and full of rocks and reached a maximum depth of over 80 cm. at about N1.75E2. By the time we had dug into the pit from the bank to the west-east 0 profile, we realized that there were layers of rock and charcoal at various depths within it, indicating separate uses or occupations. However, as we dug alternate squares farther north, we were unable to follow these layers and ended up plotting rocks (and some artifacts) on three arbitrary divisions of rock levels—upper, middle, and lower—at the bottom of the pit (see West-East 0 Profile, Fig. 60). Under the pit and refuse were stratified layers of sand, gravel, and clays which we called Zone C representing the original high terrace deposits.

The size of the site, the size of the originally-dug pit, and the size of the concentrations of fire-cracked rock within the pit on the same levels suggested a series of macroband occupations, although, of course, there could have been an occasional microband occupation. Seasonality of the occupations was difficult to determine. We found only unidentifiable scraps of burned mammal bones and no preserved plant remains. However, we did find a few charred fragments of *Agave* leaves and pochote pods in a burned rock concentration in Square S1E3, a milling stone in the middle rock level, and an ovoid mano or muller in the upper rock level. These all suggested that at least parts of all three uses of the pit were in the late spring or early summer.

Although we cannot determine the cultural activities of all portions of the site, we can get some ideas as to what went on in the area of the pit. Basically, the pit

was a large roasting area; fires were made in various parts of it, rocks placed on the hot coals, and food roasted on the hot rocks. We know some of these fires were made at different times, but it is difficult to determine whether or not there was ever more than one fire at one time in the pit. It seems that most of the tools associated with the pit were connected with food preparation activities. The 3 multi-faceted, 3 flat-topped, and 3 domed and 2 fragments of scraper-planes and the crude ovoid end-scraper may have been used to scrape plant leaves and other vegetal materials. The disk chopper, the 3 blocky-core choppers, the flake chopper, and even the hammerstones may have been used to chop up and mash both the plant remains and the meat and even the bones, for we found 14 small smashed and burned fragments of larger mammal bones. The mortar, milling stone, and ovoid mano or muller could have been used to grind seeds. There were also a number of all-purpose cutting tools which could have been used in preparing food, as well as in other activities. These might include 2 square-based bifaces, 2 ovoid bifaces, a crude blade, a thin flake biface with two edges retouched, and 6 thick side-scrappers, 1 of which had one edge retouched and 5 of which had one edge utilized.

There were very few other activities in the firepit area; however, the Abejas point in the upper level of rocks does indicate atlatl dart hunting. Further, the 2 spokeshaves may represent a woodworking activity and the 12 chips (9 of which were not in the pit) and 10 hammerstones (4 of which were not in the pit) might represent some flint knapping. On the basis of surface collections, evidence for these is far better for other areas of the site, but more excavation will be necessary before these activities can be convincingly described in detail. The artifacts found both in excavation and in the adjacent areas indicate that Ts 381w must be considered a probable component of the El Riego Phase.

While we were surface collecting at Ts 381e, another archaeological feature was noted in an erosional cut about 126 meters east and 24 meters north of the excavation described above. This pit was also a large one (about 60 cm. deep and 4 meters wide) that extended down from the bottom of a 40-cm.-thick layer of gray refuse and humus, but otherwise was very different from the one at Ts 381w. At its bottom was a definite charcoal floor and a real hearth and there were no rocks in the fill of the pit. Further, from the gully (through the site draining south into the canal) we uncovered a large number of artifacts including 4



Fig. 61. A reconstructed Abejas village based on Ts 381. (Courtesy of the National Museum of Anthropology and History of Mexico.)

oblong manos, a long (lenticular) mano, a fine blade, and 3 stone bowl fragments—all diagnostic Abejas artifacts.

Since we had not excavated an Abejas open site, testing seemed necessary; and, when Dr. James Ford (late of the Florida State Museum) visited our site shortly after we found this feature, we cleaned off with a trowel to a vertical profile the two small gullies and peninsula between to cross-section the pit we had found. Dr. Ford found an ellipsoidal chopper fragment and a Pelona point just above the charcoal floor, and MacNeish found some fire-cracked rock, pieces of 3 stone bowls, and pieces of a thin ovoid biface on a hearth-like area. We were convinced that we had found a pit house, the first of its kind in all of Mesoamerica (Fig. 61). A careful excavation was then necessary and we staked out the area in 1-meter squares. The grids were as wide as the pit as seen from our gully excavation (about 4 meters east-west) and extended from the peninsula-like area northward about 5 meters. In terms of the system at Ts 381w, these corner squares were numbered N24E125, N24E129, N29E125, and N29E129. Initially, two alternate squares were dug at the north end of the grid area to determine the northern extent of the house. At a depth of 40 to 50 cm. we struck sterile yellow clayish soils which indicated that we were north of the pit house; next we dug Squares N29E127 and N29E129 just to make sure. We then levelled off the bottom of the trench to 50 cm. and moved into Square N24E127 at the same level.

Here at 50 cm. in the northeast corner of the square were areas of bright yellow clay like the floor of the previous trench; the southeast half of the square at the 50-cm. level was dark gray refuse soil. Digging Squares N24E126 and N24E129 revealed, at the 50-cm. level, more yellow soil, as did the north-end half of N24E128; the southwest half of N24E128 was dark refuse that connected with that found in the southeast half of Square N24E127. We were then able to discern the ovoid north end of the refuse fill of the pit house at the 50-cm. level. While our workmen were uncovering the top outline of the pit house at its north end, MacNeish and Mrs. MacNeish dug down from the gully and uncovered the pit house floor at about the 1-meter to 1.05-meter level. We excavated to just above the charcoal floor by a vertical slicing technique, leaving any artifacts or rocks on the floor in situ. In the lower portion of the overlying humus and refuse above 50 cm. were a few chips (19), but no artifacts. In the fill we found 2 stone bowl fragments, 4 chips, and 2 ellipsoidal chopper fragments, as well as a few artifacts—a San Nicolas point and a blocky-core chopper—and stone bowl fragments with fire-cracked rock sticking up from the floor.

The most important results of the excavation of these squares, however, were, first, the 2-meter profile through the pit house and second, the realization that the charcoal of the floor did not extend up the sides of the pit to the original surface. When we realized this, we also realized that it would be difficult to dis-

cern the sloping sides of the pit unless we knew its outline, so we went back and cleaned off the rest of the squares down to a 50-cm. depth. We could now determine the outline of the pit, for the surrounding original soil was bright yellow, while the fill of the pit was dark grayish-brown. Originally, the pit had been oval in outline with a maximum width of 3.91 meters; we estimated its maximum length at about 5.25 meters. We say "estimate" in regard to length because, although approximately the last one meter of the pit had eroded away by gullying, the curvature of the lateral walls indicated about where they would have met. The architectural outlines were then drawn and photographed (the latter not very well) and we were ready to trace the sides of the pit. We worked in two-man teams on the south side, one member scraping away the pit fill to the yellow soil from the 50-cm. level. The other facing him worked on the deep interior face, slicing the whole profile down to the charcoal floor, or until the dark refuse was removed to reveal the yellow sterile sub-soil. The final excavation of the pit house was the removal of the charcoal floor. At this time the majority of the artifacts and house features were uncovered and recorded.

We now had a house, and so we decided to see if we could find the rest of the village and any other architectural features. We gridded the entire area into 18 1-meter squares about 10 meters apart and dug them into sterile soils at about 50-cm. depth. Our attempt to find the village was not successful; nevertheless, we did uncover some sort of trench feature in E140; a blocky-core chopper, a crude blade with a prepared striking platform, and 16 flakes in N10E118; 2 chips and a crude blade in N20E118; and a fragment of a square-based biface in N30E160. All of these were just below the humus and were catalogued with the other surface findings.

A study of the house feature gave us some idea as to its construction. First, an oval pit about 4 meters wide and 5.25 meters long was dug. This pit was about 60 to 70 cm. deep with a relatively flat bottom that had a maximum width of slightly over 2 meters and a maximum length of about 3 meters. Next, at the north end of this level bottom floor we uncovered the remains of a post (about 15 cm. in diameter) that had been sunk into a 20-cm. vertical hole; thus, the post must have stood upright. Three smaller posts leaned in from the north edge of this pit at such an angle as to suggest that, if they were connected with the top of the upright post, the house would have been between 1.5 meters and 2 meters in height. Also, in the center of the west side of the house we found what

may have been a post mold sloped at about the same angle but pointed toward the center of the house and not at an upright. We believe this post leaned on a central ridge pole that extended from the north upright post to a south upright post that was destroyed by the gullying of the south end of the house. Therefore, our conclusion is that, after the initial flat-bottomed pit had been dug, two upright posts about 2 meters high were placed at either end of the floor some 3 meters apart and a ridge pole of that length run from the top of one pole to the top of the other. The diameter of the 4 small post molds at the edge of the pit and the 3 charred sticks (covered with brush and twigs on the floor) suggest that small sticks from 2 to 10 cm. in diameter were laid against the ridge pole from all sides of the edge of the pit and that on top of these sloping sticks were placed brush and twigs (perhaps with the leaves adhering). Now that a pup-tent-like roof covered the pit, 7 slabs 20 to 40 cm. in length and 2 to 10 cm. thick were laid against the middle of the eastern sloping wall of the pit and 2 (perhaps 3; one slab was found in the western gully) were placed against the walls of the western sloping wall. These may have served to keep the steep walls of the sides of the pit from slumping in. The final stage of construction was the scooping out of a small portion of the floor (30 by 20 cm.) between the two upright posts to form a small firepit about 10 cm. deep. Although it could not be determined where the smoke from this firepit went nor where the entrance to the house was, both might have been in the south end where the house had eroded away.

Most of the artifacts within the house seemed to be connected with subsistence and preparation of foods. The spherical mano indicates back-and-forth grinding of grain, probably corn. The multi-faceted and domed scraper-planes and the single crude discoidal end-scraper indicate scraping and pulping leafy wild plant foods. These tools could have been used, of course, for scraping skins, but the almost complete lack of bones within the house and the 7 end-scrappers and 4 side-scrappers outside the house suggest that skin-scraping was an outdoor rather than an indoor activity. The 2 blocky cores (1 ellipsoidal), the disk, and single pebble chopper were probably used to chop up foodstuffs. The crude blade, the fine obsidian blade, the 4 ovoid bifaces, and the 2 flakes with one edge utilized, all could have been used in food preparation as well as in many other activities. The many stone bowls in and around the hearth filled with fire-cracked pebbles suggest that food was cooked in stone bowls as well as roasted on hot rocks. The Shumla, Garyito, and Abejas

points on the floor and the San Nicolas point just above the floor might, of course, be taken as evidence of hunting and weapon-making. However, the relative absence of bones and the occurrence of the three points right on the floor (at the edge of the pit just under the eaves of the roof) suggest that these weapons were merely being stored in the house and were not actively being used. Further, the relative lack of chips in the house and the presence of cores and chips in Square N20E116 outside the house suggest flint knapping as another outdoor activity. It might be added that the presence of a paint pallet inside the house may indicate that some of the inhabitants were engaged in artistic activities. In conclusion, and in looking at the artifacts and their inferred uses, we get a definite impression that most of the activities in this house were carried on by the women and that men's activities, which left material remains, were done outside the house or away from home.

The pit house suggests that the inhabitants, at least some of them, were living permanently, or at least for a number of years, at this site. Further, the size of the site suggests a group larger than a single family. Thus, we believe Ts 381e represents at least a small hamlet, and that more testing would eventually yield more houses. We say this because, at the nearby Abejas site, Ts 388, we uncovered a parallel alignment of three groups of stone slabs, characteristic of the small hamlet.

The tools certainly indicate that the house be considered an Abejas component at about 3000 B.C.—the beginning of settled village life in the Tehuacan Valley.

Summary of the Cultural Sequence in the San Marcos Locality

Our archaeological information from this region is woefully inadequate, and we cannot give as full a picture of the way of life of its ancient inhabitants as we would have liked. This may, in part, be the fault of we archaeologists, but we prefer to think that there may be a more factual explanation: that is, the zone was never popular with prehistoric man, and forays into its harsh environment were not numerous. Furthermore, they could have occurred only during the wet seasons and then only for rather specialized activities.

Although we have no excavated evidence of occupation for our earliest Ajuereado Phase and, therefore, no direct knowledge as to man's activities then, artifacts from survey sites and the bones of extinct animals

noted in arroyo banks in survey suggest some kind of occupation during this period. This was a period when the arroyos and the valleys probably had enough water for early man to survive and vegetation was consequently more lush than it is at present.

Both microband and macroband occupations during El Riego times took place during the wet season, and there were hints that plant collecting and small-animal trapping were then major activities. In the Coxcatlan Phase this pattern continued; although we excavated no macroband encampment, evidence of Coxcatlan macrobands were found in survey. These macroband forays into the area were similar to those of earlier times in that the emphasis was still on wild plant collecting. However, we see some fundamental differences. First of all, there is definite evidence that Coxcatlan man collected wild corn and, what is highly significant, the cave occupants were apparently planting domesticated or early cultivated corn during their brief wet-season stays. In the following Abejas Phase wet-season corn farming continued, but other aspects of the way of life differed. In at least one spot (perhaps two), pit-house structures were built. This implies a food surplus, or a food supply greater than any that could be consumed in one season, and relatively sedentary living.

This pattern continued into later phases. In Ajalpan times there were visits, or a visit, into the zone to plant and harvest corn during the wet season. In both Venta Salada and Palo Blanco times man again left his hilltop village or town during the wet season to plant, perhaps now in irrigated fields in the canyons of the travertine slopes. In these later periods so many other activities were going on in other more permanent habitations that we can safely say, as far as concerns much of the locality we investigated, the action was elsewhere.

In conclusion then, the western travertine slopes, or at least the localities that we investigated, had a persistently similar pattern of exploitation through time, without much evidence of cultural advancement. The way of life here was apparently limited to plant collecting or agriculture in the wet season for brief periods. Even though great cultural changes were taking place elsewhere, prehistoric man never quite conquered this relatively barren area; the best he could do was to exploit it briefly when the rains came. Even today, with quarry operations and a salt industry, the western travertine slopes locality still has the lowest standard of living in the valley.



CHAPTER 5

Excavations in the Ajalpan Locality in the Valley Center

Richard S. MacNeish and Frederick A. Peterson

DURING THE SUMMER OF 1961 survey led Fred Peterson into the clay pit area south of the town of Ajalpan. Here a vast area of huge pits (some 20 to 30 meters deep) had been dug into by local contractors to supply the local tile industry with clay. The sides of the clay pits revealed extensive soil profiles. Further, many of these deep stratified cuts revealed overlying cultural deposits. The clay diggers, desiring relatively pure clay, often stripped off the top layers and left these artifact-rich materials in piles next to

their pits. It was a paradise for the collector of Indian relics and Peterson had a field-day filling his survey bags with examples of every type of pottery and artifact garnered in the first season's excavation, as well as quite a number of types he had never seen in our valley. He wrote MacNeish (then at work in the Yukon) an enthusiastic letter about his findings in which he mentioned an area that had quantities of Chiapas de Corzo I and II-like sherds, as well as parts of stone bowls like those found in Late Preceramic deposits in

preliminary soundings in Coxcatlan Cave. This information lured MacNeish to diverge slightly from his normal return route to Ottawa, now by way of Tehuacan. En route, as he unsuspectingly lunched in Whitehorse, suppered in Vancouver, and breakfasted in Mexico, his baggage was on its way to Montreal by way of Tokyo.

However, MacNeish did not need his errant baggage as he and Peterson began to examine the clay pits Peterson found. A small part of the high river terrace about 1.5 kilometers south of Ajalpan was left intact by the clay diggers. This peninsula-like area had 2 meters of Early Ceramic refuse and was designated site Ts 204 (Fig. 62) and marked for excavation, taking place in March and April of 1962. The senior author encouraged Peterson to intensively survey the clay pits for other good Early Ceramic or Preceramic sites which might be worthy of excavation. This he did and so found the Canoas site, Ts 367, about 1.5 kilometers south of Ajalpan on the east bank of the Rio Salado (Fig. 79), and the Coatepec site, Ts 368, about 2 kilometers south of Ajalpan and 200 meters south-east of the river (Fig. 67). All three sites were to be excavated in the spring of 1962. Furthermore, all three were in a specialized environmental zone called the Humid River Bottoms. In his full reconnaissance, Peterson also discovered the Late Formative Quachilco site, Tr 218, about 5 kilometers south of Altepexi (Fig. 81). Tr 218 was in the Valley Center Steppe zone or "short-grassed steppe west of Venta Salada."

The Valley Center Steppe zone and the Humid River Bottoms zone have some elements in common; both are between 1600 and 1000 meters in elevation and have an annual rainfall of between 400 and 600 mm., with an average annual temperature between 19° and 24° centigrade. The humid river bottoms are easily distinguished from the valley steppes, however, because of the deep fertile alluvial soils and permanent water source, the Rio Salado. This results in a distinctive flora and fauna in the river bottoms and on the adjacent river banks and immediate surfaces of the surrounding high river terraces. The river-arroyo vegetation is somewhat lusher than vegetation elsewhere in the valley. It is densely thicketed and includes a number of kinds of fruit trees, chupandilla, cosahuico, ciruela, *Bumelia*, *Physalis*, and *Vallesia glabra*. There are *Acacia unijuga* and mesquite trees as well. All of these trees are usually covered with Spanish moss (*Tillandsia usneoides*). They form a canopy over thickets of river cane (*Phragmites communis*), marsh weeds, palm (*Brahea dulcis*), and sotolin (*Beaucarnea gracilis*). There are some grasses and amaranth. A

wide variety of animals rare or absent in other environs in the valley include teal (*Anas cyanoptera*), crane (*Grus canadensis*), and killdeer (*Charadrius vociferus*) in the dry winter season and dove (*Zenaida asiatica*), quail (*Colinus virginianus*), mud turtle (*Kinosternon integrum*), fish, and green iguana (*Iguana iguana*) in the wet season. Animals common to the rest of the valley such as opossum, cottontail rabbit, deer, peccary, skunk, raccoon, hawk, black iguana, lizard, snake, and fox seem to be more common in this riverine environment during the dry season. From many standpoints this environment is the best one for year-round living in the valley, particularly so, like El Riego, in the dry season when other micro-environments yield little food and animals are forced out due to the dire dry conditions. However, unlike El Riego, it can accommodate large permanent populations, and has done so since Formative times. It is probably due to inadequate survey and to the present extensive utilization of the area that more diggable Preceramic sites were not found. Many sites may have been destroyed completely or may be now hidden by present-day cultivation.

This relatively desirable environmental zone stands out in marked contrast to the valley center steppes where the Quachilco site was found. Most of this zone lies west of the Rio Salado and north of the river's confluence with the Rio Zapotitlan. Its soils are relatively shallow and heavily impregnated with salts and travertine. These soils and the limited amounts of seasonal rainfall create a relatively barren grassland spotted here and there with *Agave*, *Opuntia*, mesquite, and an occasional tree legume. Food from these plants is available mainly during the spring. Jackrabbits and kangaroo rats are the dominant fauna of the locality; night hawks and owls prey on them and, in the wet parts of the year, there are opossum, deer, and fox. During the Pleistocene this was probably a major habitat of the horse and antelope. Occasional salt seeps probably had considerable value but, generally speaking, the area could support few people before the advent of irrigation agriculture.

Excavations in these locales during the 1962 season yielded enough materials of the Formative or Preclassic Period to give us a good ceramic sequence. Because of the relative abundance of these materials, the zone stands out in marked contrast to the other micro-environments of the valley which yielded little or no remains of this period from 1500 to 100 B.C. Further, excavations here differed somewhat from those of other areas in that many of them were merely strati-tests in rather large sites and were not as well-

documented. This resulted in considerably less knowledge of the way of life of the occupations. With less data, then, computer floor plots would not have significantly added to the descriptions of the Ajalpan sites and have been omitted.

The Ajalpan Sites

The Ajalpan sites, one to two kilometers south of the town of Ajalpan, are located on the high terrace of the east bank of the Rio Salado. Because of irrigation practices little if any water flows through the river bed, and the gallery forest vegetation and corresponding fauna assemblage are diminished, if not extinguished. Further, due to the commercial activities of the clay contractors, a huge area about .5 to 3 kilometers south of town had been pitted and desecrated until it looked like the surface of the moon, or the land God forgot. The clays of the terrace were heavily dug into; still, enough was left to allow C. Vita Finzi of the University of London to study deposits and determine the final formation of the terrace. He concluded that the terrace reached its final period of deposition about 10,000 to 12,000 years ago. He dated humus deposits on the top of the terrace by radiocarbon determination at $15,550 \pm 320$ B.C. (I-4602), 7800 ± 140 B.C. (I-4597), and 8100 ± 150 B.C. (I-4800). Also, the piles of artifactual materials left by the clay diggers contained Lerma points, further substantiating the dates.

At the end of the summer the authors decided that this was worth excavation, so MacNeish began testing in January, 1962. The first area tested was about 500 meters south of the northern part of the commercial digging, west of the entree road and just east of the Rio Salado. This area designated Ts 204B was an exposed bank with huge prehistoric pits in it. Clearing off the profile of one pit, MacNeish determined that the ceramics were not very early and were not connected with other Early Ajalpan ceramic remains. The material was then sacked so it could be analyzed as a surface collection of a distinct Ajalpan component. The peripatetic senior author and his blitz crew then turned to a small mesa about 400 meters southeast of Ts 204B. This site, called Ts 204A, yielded little well-defined stratigraphy and only Late Ajalpan materials in its two-cubic-meter-square excavation, so it too was abandoned. Having thus quickly disposed of Ts 204B and Ts 204A, MacNeish returned with his crew to the peninsula-like area of the high terrace that Peterson had shown him in the first place, Ts 204. Two square meters, N3W1 and N3W2, on the north side of this area, were chosen for excavation. The strata were peeled off from the bank's face to a depth of about 2

meters, revealing clear-cut stratigraphy and abundant materials (Fig. 63). This was where the major effort was to take place.

It was not until March 14th, 1962, that we got around to it. By that time we had decided to stake out the peninsula into a block 8 meters wide north and south and 8 meters long east and west and to attack just this portion of the site. We had to have good control of the stratigraphy within this block, so a profile was cleaned off around it, first along the S4 profile from the W6 axis to the E5 axis, then from Square S4E6 to N3E6 along the E5 profile, and last along the N4 profile from the E5 to the W5 axis. The strata were now readily distinguishable on three sides of the block and were called Zones A through H (Fig. 63). After some initial digging into the block from the east end, in Squares S4E5 and S2E5, it became apparent that Zones A and B, the top one meter, were colluvium, without real occupational floors. We decided to remove all of this "over-burden" by digging the southeast quadrant from the 0 axis to S1E5 to S4E5 to S4E1 to Zone C at a depth of one meter by the alternate square method (Fig. 64). The lower part, Zones C through H, was attacked by the same method and charcoal floors discovered on top of F and G were appropriately called Zones F¹ and G¹. During this period there was a very conscious effort to find post holes, to photograph and draw the soil profiles with a fair degree of precision, and to take adequate square description notes.

When this quadrant was completed (the senior author was now only rarely concerned with Ts 204) excavation of the northeast quadrant was begun by roughly the same digging technique. Unfortunately, since we had been unsuccessful before, the search for post holes ceased. Furthermore, profiles were not very well drawn and the square descriptions and field notes became little more than a catalogue of artifacts. However, the two blocks were eventually completed and we had a long face along the 0 profile from S5 to N5. This face was dug into westward by the alternate square technique to the W1 profile, and then, in 1963, Fred Johnson used a similar method to dig westward to the W2 profile. During these later excavations our techniques, field notes, and profile drawings were somewhat better but were still below the standards we used in our cave excavations.

In mid-April, while we were setting up screens some 25 meters southwest of the major excavation, a large figurine was found. This area we designated Ts 204C. Douglas and Dorothy Byers and the senior author were

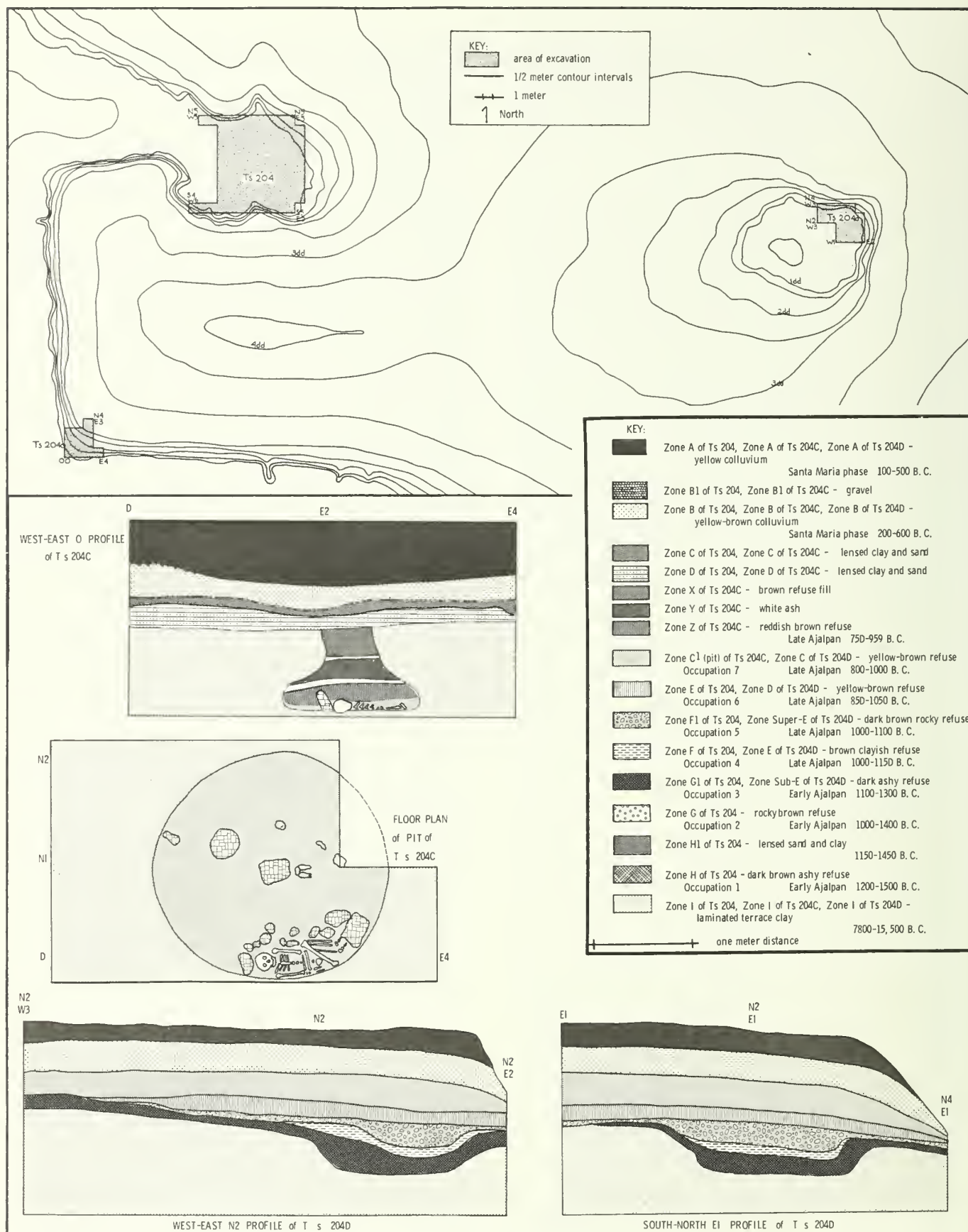
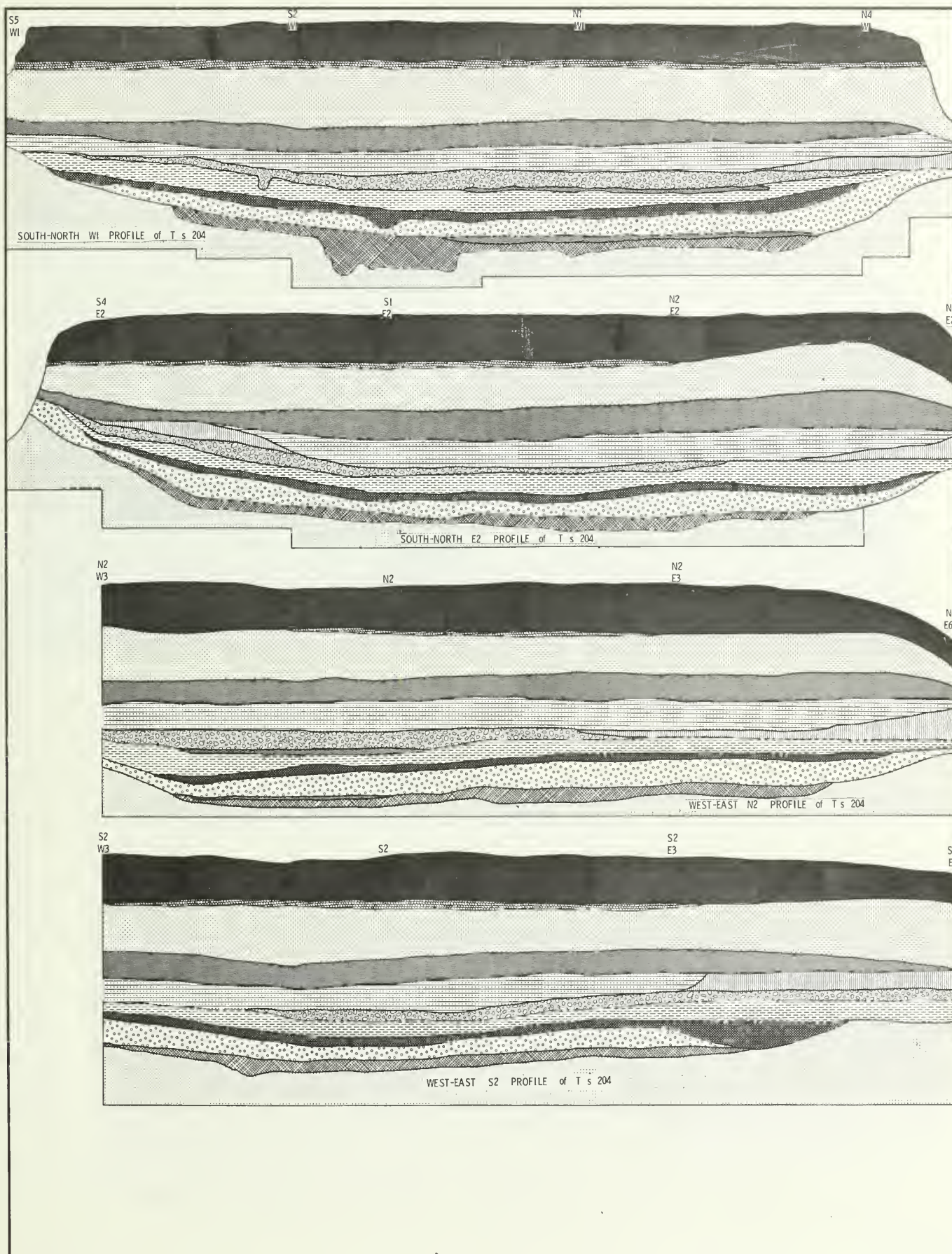


Fig. 63. Contour map of Ajalpan site (top), profiles and floor plan of the pit Ts 204C (middle), Ts 204D profiles (lower) and Ts 204 profiles (facing page).



(Fig. 63 continued)



Fig. 64. The alternate square method of excavating Ts 204.



Fig. 65. The south-north W1 profile of Ts 204 with key to the stratigraphy to the right.

T A B L E 7
Sequence in the Ajalpan Sites (Ts 204, Ts 204C, Ts 204D)

	Ts 204C	Ts 204	Ts 204D	
		<i>Santa Maria Phase</i>		
	Zone A	Zone A	Zone A	500-100 B.C.
	Zone B ¹	Zone B ¹		
	Zone B	Zone B	Zone B	600-200 B.C.
	Zone C	Zone C		
	Zone D	Zone D		
		<i>Late Ajalpan Subphase</i>		
	Zones X, Y, Z			959-750 B.C.
Occupation 7	Zone C ¹ (pit)		Zone C	1000-800 B.C.
Occupation 6		Zone E	Zone D	1050-850 B.C.
Occupation 5		Zone F ¹	Zone Super-E	1100-1000 B.C.
Occupation 4		Zone F	Zone E	1150-1000 B.C.
		<i>Early Ajalpan Subphase</i>		
Occupation 3		Zone G ¹	Zone Sub-E	1300-1100 B.C.
Occupation 2		Zone G		1400-1000 B.C.
		Zone H ¹		1450-1150 B.C.
Occupation 1		Zone H		1500-1200 B.C.
	Zone I	Zone I	Zone I	15,500-7800 B.C.

to excavate 16 square meters here, and in doing so uncovered a large bell-shaped pit which had been dug down from below the sands of Zone D. The pit was somewhat later than most of the materials at Ts 204. This site was meticulously dug, photographed, and recorded, thanks to Doug Byers.

About the time Ts 204C was being completed, we cleaned off the east walls of a small pillar in the clay pits, some 60 meters east of Ts 204, and dug 14 square meters into it in the hope of determining the extent of the habitation areas in Ts 204. Here field notes were adequate and profiles well done. Eventually, ceramic analysis of materials from Ts 204D allowed us to correlate its strata with those at Ts 204 and Ts 204C. Although the materials we uncovered were limited, the effort was worthwhile in that it delimited the area of the various hamlet occupations.

Before we completed digging Ts 204, one more effort was made about 100 yards northeast of Ts 204 in a small pillar. Ts 204E was a series of deposits for the most part washed into some sort of depression after the Ajalpan occupation. Much of it was dug in arbitrary 20-cm. levels, the profiles were inaccurately done, the notes were not informative, and the materials could not be connected with those of our other excavations. In a word, we goofed, and the less said about Ts 204E the better. Nevertheless, we obtained a considerable amount of stratified material here for the period from 1500 to 900 B.C., and were able to correlate the strati-

graphy of the three digs at Ts 204, Ts 204C, and Ts 204D (see Table 7). Our contextual data, although woefully incomplete, gives us a glimpse of life during this period, which we shall describe from the earliest occupation to the most recent.

The Way of Life of Zone H

The earliest occupation was roughly in the center of Ts 204 in a large shallow depression where soil had eroded away. The northern, eastern, and western limits of the depression, and of Zone H, were well defined. The western edge ran from about N1W5 to S4W1. The eastern edge was more irregular, from N2E4 to S3E2 and widening out at S5 to E3.5. This suggests that to the south the depression and Zone H may have extended some 5 to 10 meters southeast of our excavated peninsula. The area excavated was only about 5 to 10 meters wide and about 10 meters long northwest to southeast but, as we mentioned, may have extended for as many as 20 meters in length.

Most of Zone H was covered by Zone G, except for the deepest portions of the site where there was a fine layer (1 to 3 cm. thick) of waterlaid salt (Zone H¹). The stratum averaged about 10 cm. in thickness and was composed of dark brown ashy soils often burned orange at the surface. It reached its maximum thickness of about 20 cm. in Square S1 where a deep 30-cm. fire pit, about a meter in diameter, was found along with two post holes. The maximum concentration of

refuse was in a 2-meter-wide strip just north, east, and south of the firepit, and one other post hole was found just southeast of this area at S3E1. An intensive and frustrating search revealed no other post holes; nevertheless, the ones found, the many pieces of burned wattle-and-daub, and the red and white painted plaster all suggest that Zone H contained some sort of oval or rectangular house structure. It was difficult to determine where the rest of the hamlet was because of the clay diggers' operation. Ts 204D, 50 meters to the east, Ts 204C, 25 meters to the southwest, and the clay pit profile to the north contained no sherds or strata with sherds of the time of Zone H. There were, however, two pits of artifacts left by the clay diggers about 25 and 60 meters southeast of our dig which contained figurines and sherds of very early Ajalpan times. Perhaps the house of Ts 204 was part of a linear hamlet running northwest-southeast parallel to the Rio Salado. The hamlet may have been about 10 to 20 meters wide and about 100 meters long containing five or six houses.

A study of the artifacts and ecofacts from our excavation gave us some hints of the life of the occupants of this hamlet, at least of the activities carried on in one of its houses. Unlike the cave sites, it is difficult to estimate the sustenance of the inhabitants because we do not have preserved vegetal remains or coprolites. However, the bones of 3 deer, 2 dogs, a peccary, a coyote, and a turtle suggest that meat was an important part of the diet. Although the dogs were obviously domesticated, Garyito, Catan, Pelona, Zacatenco, and Palmillas points in association with bones of the larger wild animals suggest that hunting, probably trailing or stalking with the atlatl dart, was still in practice. Further, the deer antler seems to indicate that hunting usually occurred in the winter months, perhaps when barranca wet-season agriculture could not be practiced; however, turtle shells showed that Zone H was occupied all year round. There were many limb bones and a few vertebrae and jaws but no skull or bones from other parts of the body. Initial butchering evidently took place at the kill site, or at least not at the home. However, many splinters and bones with nicks and cuts on them indicate further butchering on the parts brought back to their homes; perhaps the blades, the thick and thin flakes with one edge utilized, the thin bifacial knives, and some of the discoidal or ellipsoidal choppers were the tools used. Many charred bones and burned rocks included those in the large hearth or roasting pit. Roasting the meal was the common practice, although some meat may have been cooked in the tecomate pots with carbon adhering to their interiors.

Two by-products of this concern with animals were bone-tool making and possibly skin preparation. As mentioned, many of the bones were cut and splintcred. The rib bone, spatula, and other ribs and splinters seem to have been cut or whittled—not sawed—into long rectangular bone planks. A cut antler made into a flaker, a flat bone needle, and a spatula were the end products and the flake gravers, the spokeshave-like tools (used as beamers), and the various flake tools and blades were the tools of the trade.

The long flake end-scrappers, the thin flake end-scrappers, the crude discoidal end-scrappers, the end-of-blade scraper, and the fine ovoid plano-convex end-scrappers in conjunction with bones of fur-bearing animals such as deer, coyote, and dogs indicate skins were worked. The flakes, blades, gravers, the bone needle, the spatula, and the antler tine may have been the tools used in tailoring these skins. The bone spatula could have been used in loom weaving, of course, but there is little other evidence of this craft.

In contrast to the large amount of direct evidence of the use of fauna, considerable indirect evidence of the exploitation of the flora came from the many ground stone tools of a wide variety of types. These included a bell-shaped and a truncated cone pestle as well as 44 pebble hammers which could have been used to crush seeds or chili. These tools are far outnumbered by the tools for grinding seeds (probably mainly of corn): metate fragments, boulder metate-milling stones, trough metates, ovoid plano-convex metates, saucer-shaped and ovoid-lipped metates, along with mano-mullers, ovoid mullers, ovoid and spherical manos, and long manos triangular in cross-section. Corn may have been a major food all year long; perhaps a surplus crop was grown in the nearby barrancas or flood plains during the brief wet season. Although this is our interpretation, it must be remembered that any conclusion about diet or subsistence activities is at best tentative when based on open site information that lacks adequate samples of ecofacts.

Most of our evidence of the vegetal aspect of the subsistence obviously comes from food preparation tools. Most vegetal foods seem to have been ground, although some were pounded into a form for cooking. Of the dominant vessel forms, the tecomate rim sherds outnumbered all other vessel forms about two to one—about half of them had burned interiors, suggesting that vegetal foods were boiled. Two rim sherds of convex bowls had burned interiors, as had many tecomates. The tecomates may mean that some food was cooked by some sort of steaming practice. The long-flaring-rim bowls and short-flaring-rim ollas may have

been used for storage, as were some of the tecomates and convex bowls. The latter, of course, could have been for eating or for decorative purposes. Although all the pottery, with the possible exception of the Ajalpan Fine Red and Plain types, seems to have been made of local clays, we found no evidence of pottery-making in this house oven.

There was some evidence of two other mundane activities, flint knapping and woodworking.

About a dozen cores were uncovered. Many of the blocky cores, discoidal cores, and chopper fragments were probably cores as well. The prepared platform of the many flakes suggests that flakes were removed from cores by direct percussion by some of the heavier and larger pebble hammers. The side-scrapers and many of the end-scrapers were made from these flakes directly by pressure-retouching. The flakes for the projectile points, Catan or Pelona, seem to have been further percussion-flaked by small hammers into blanks or preforms and then worked into final form by pressure-retouching with the antler tines.

Evidence for woodworking and house-building was less direct. Most of it came from the molds of sticks and logs on the turned wattle-and-daub. Certainly the sticks and logs were somehow cut, sawed, or chopped, but we have no more details of this activity.

Evidence of less directly utilitarian activities was even more incomplete. The Ajalpan Fine Red pot, the obsidian blades, the red specular hematite points, the volcanic tufa for grinding stones, and the jade pendants indicated that there was some sort of trade and an exchange system. The worked shell pendants, paint palettes, and figurines seemed to show that some artistic activities were undertaken locally. The figurines, the spherical and the flat punched-feature types, and their body parts (probably 6 in total), were extremely similar to each other. Their religious and social structure implications will become clearer when we consider the early floors of Coatepec. The hollow figurine body fragment at the edge of the Zone H deposits was not connected with the other figurines or the majority of the artifacts. What this means is not clear. Burned human bones of an adult or adults hint at other poorly understood ceremonial practices.

All in all, this is only the smallest glimpse of human activity of the Zone H hamlet occupation No. 1. The artifacts and sherds definitely show it to be a component of the Ajalpan Phase and very early in that phase. The radiocarbon determination of 1270 B.C. \pm 130 (I-929) (*Radiocarbon* 11:98) on charcoal from the eastern edge of the occupation tends to confirm this temporal estimate.

The Way of Life of Zone G

Zone G, 10 to 30 cm. of brown soil filled with rocks and artifacts, filled the same depression as Zone H of Ts 204 but extended 3 to 4 meters farther to the east, west, and north. Its southern extension is unknown. The two piles of artifacts to the southeast might have been from this part of the zone or from a contemporary part of the same hamlet. This hamlet might have been roughly 100 meters long and 20 meters wide. The character of Zone G is very different from that of Zone H. It had no hearths, no post holes, nor any horizontal burnt layers that might be interpreted as floors. In fact, the only feature it had that even remotely resembled these evidences of occupation was an ill-defined pit perhaps for refuse in Squares N1E3, N2E3, and N3E3. All of these factors led us to interpret Zone G as a stratum resulting from refuse dumped from other living areas rather than as an occupational locus. This means that the artifacts and ecofacts reflect the way of life of the entire hamlet rather than that of a specific house or houses in it, and that any interpretations of ancient activities cannot make use of the more reliable associational evidence that comes from well-delineated floors of actual houses or other occupational loci. Be that as it may, the artifacts and ecofacts of Zone G are much like those of Zone H, which was a definite occupation, and this suggests that the way of life of Zone G was much the same as that of Zone H.

Bones of Zone G came from 5 deer, 1 peccary, 2 dogs, 1 cottontail, 2 turtles, 2 lizards, and a raven. Abasolo, Garyito, and Zacatenco points were found. Hunting was still important and meat was a major item of their diet. Unlike Zone H, however, the deer bones of Zone G were from all the seasons rather than only the dry season. Like Zone H, however, they were often burned. Hundreds of pieces of fire-cracked rock in the stratum suggested meat roasting was also a common practice. A by-product of the hunt was bone for making bone tools—antler flakers, a split-bone awl, a metapodial awl, and a flat bone needle. These tools, the bones, and the crude ovoid and long flake end-scrapers, the end-of-blade scraper, and the fine plano-convex end-scraper all suggest skin preparation. The many grinding tools suggest seed (corn) preparation and agriculture. Tecomates were still the dominant vessel form and suggest boiling or steaming food.

Chips, many hammerstones, an abrader hammer, an anvil stone, as well as a blocky core, spherical battered choppers and ellipsoidal, discoidal, and pebble choppers (which may have been cores) show that the same type of flint knapping as seen on Zone H continued on

Zone G. Besides the wood and stick impressions in wattle-and-daub, there were now more spokeshaves, an adze, a celt, and 3 abrader saws, all greater proof of woodworking. The perforated disks suggest string-making and hint of weaving activities. Further evidence of trade were the Catan Red-grooved sherds from the coast of Chiapas.

A small paint disk, a paint palette, jade pendants, mollusk pendants, and animal effigy whistles hint at artistic activities. Figurines or parts thereof were more numerous than they were in Zone H and of greater variation in type. In addition to a Spherical, Punched Feature head, 1 seated body and 3 standing bodies suggest that the type was represented by 4 whole specimens. The 2 heads of the Hollow Red Dwarf type were associated with 4 bodies, 2 arms, and 3 legs (one of which is far smaller than any of the bodies), indicating at least 5 specimens of this type. There were 2 Flat Punched Feature heads with 2 skinny arms, and 2 conical arms from at least 2 or 3 whole specimens; furthermore, a Projecting Eye type and 3 heavy solid limbs from 3 more specimens indicate at least 4 of this variety. Thus, this stratum, without a definite occupational area and probably representing refuse from a whole series of occupations or household areas, had a wide variety of figurine types, contrasted with Zone H and its definite floor and only one or two specific types.

Doesn't this indicate that, in Early Ajalpan times, certain specific figurine types occurred with each household (or kin-aggregate group therein) and that the figurines were some sort of sodality of lineages or kin-aggregate cult symbol? Furthermore, doesn't the data from Zone G suggest that the hamlets were composed of a series of different kin-aggregate groups with different sodalities or kin-aggregate symbols? Certainly our data from Zones H and G are suggestive of this, as are the data from other Ajalpan components, but, until more extensive and technically better excavation is undertaken, we cannot say that this hypothesis has been adequately tested.

In conclusion, the artifacts suggest that Zone G is an Early Ajalpan component, albeit inadequately defined as to its occupational area. We have interpreted its Carbon-14 date of 1150 ± 140 B.C. (I-934) (*Radio-carbon* 11:98) to mean that the refuse was dumped into our area of excavation in the general period from 1400 to 1000 B.C. (Occupation 2).

The Way of Life of Zone G¹ and Zone Sub-E

Capping the refuse of Zone G of Ts 204 which had begun to fill much of the original depression in the

high terrace was a 4-to-10-cm.-thick layer composed of burned rock, ash, charcoal, burned earth, and artifacts—Zone G¹. What is more, at the south edge of our excavation on the S5 profile, there was a definite floor level, called Feature 1, that extended up to the S2 axis and died out to the northwest between the W1 and E1 axes at about N2. Dug down from this at S1W1 and S2W1 were two post holes. A large conoidal roasting pit 3 meters in diameter and 20 to 30 cm. deep, full of refuse and fire-cracked rock, was centered at about S2.5W3.5. We have interpreted this as representing a large roasting pit just east of some sort of house structure. Although most of the artifacts came from this area, there was another small roasting pit in N2E5. Northeast of it at the north edge of our excavation there seemed to be the edge of still another occupational locus that once extended into the pit dug by clay collectors. It contained few artifacts but seemed to have a concentration in N3E2 to N3E3 and N5E5 where we terminated our digging.

Although Zone G¹ covered all squares of our excavation, cleaning the N5 and S6 profiles revealed that it died out about 3 meters west of our excavation. The stratum did not occur in the area of Ts 204C, 25 meters southwest of the excavation, nor in the profile east of Ts 204C and south of Ts 204. We do not know how far north it may have extended; we do know that it did not occur in Ts 204E nor in the unexcavated pillar 40 meters to the north. To the east, however, percentages from Zone Sub-E in Ts 204D suggest that the stratum continued at least 60 yards in this direction, and the wall of the clay pit diggers suggests it may have extended as far as 110 meters east. Thus, Zone G¹ seemed to cover an area roughly 30 to 40 meters wide north and south and 110 to 130 meters long east and west. We consider Zone G¹ to have represented part of the floor of a hamlet covering a linear area roughly at right angles to the Rio Salado. Excavation in Ts 204 apparently sampled two household areas and Zone Sub-E at Ts 204D was another part of the hamlet.

Except for a dog mandible, a turtle shell, and some bone splinters, all the bone came from the southern occupation area, mostly from the huge roasting pit. Except for one dog axis, most of the bone came from 1 peccary and at least 4 deer. The antler indicated that the deer were eaten in the winter dry season as in Zone H. The Garyito, Shumla, Zacatenco, and Salado points seem to have been the dart points that brought them down. A Shumla point in the northeast pit and 2 Garyito and 1 Zacatenco point from Ts 204D, as well as splints of large animal bones, suggest that each

household group was involved in these winter hunts. Again, initial butchering seems to have been done in the field and the limb and tenderloin (vertebrae) portions brought home. The meat still adhering to the bones was then roasted over pits of fire-cracked rock. The relatively large number of flake side-scrapers, blades, and bifacial knives, disks, and some of the choppers may have been their butchering tools. The main grinding tools in both areas of Ts 204 (none were in Ts 204D) suggest that seed grinding was the most important food preparation technique throughout the year and that wet season barranca agriculture was a major concern. Again tecomates from all areas were the major vessel form, and many of these had adhering carbon, suggesting boiling or steaming food. There were, however, a large number of convex bowls of Ajalpan Plain and Coatepec Plain, as well as out-sloping-rim bowls of Ajalpan Fine Red in the southern floor area. Rim sherds of ollas for storage occurred everywhere.

Most of our evidence for flint knapping—flakes, hammerstones, cores, and chipped stone—came out of the huge hearth area; the bone tools occurred on the floor to the west. Techniques for both industries were like those described for Zone H. Bones of fur-bearing animals, blades, side-scrapers, scraper-plane fragments, crude long flakes, thin flake and fine ovoid plano-convex end-scrapers were distributed throughout the area, even into Ts 204D. All household groups evidently prepared skins. Two pierced sherds in the southern house area are the only evidence of string-making, but we know weaving must have occurred because the figurines show headdresses that seem to have been of some sort of fabric.

Again all areas had foreign materials—obsidian, volcanic tufa metates, Ajalpan Fine Orange sherds, and 2 sherds of Catan Grooved-red from Chiapas (in the roasting pit) suggesting trade and some sort of exchange system.

Evidence of artistic endeavors—jade pendants and an ear plug and a slab paint pallet—occurred only in the southern house area. Most of the figurine fragments occurred in Squares S4E4 and S4E5 along the southern edge or in the southern edge of the pits. Here were found 2 heads, 2 bodies, and 1 arm fragment of at least 3 Hollow Red Dwarf figurines, as well as 2 Spherical, Punched Feature heads, 1 seated body, 2 standing bodies, 3 arms, and a leg of at least 4 examples of this type. Except for a skinny arm, none of the other 7 figurine types came from the southern house or pit area, and the Projecting Eye figurine and 1 solid heavy

limb came from the northeast pit concentration. The other fragments, probably of some sort of Trackwoman type, while not specifically in the north, definitely were not in the southern floor and pit area. Thus, there is evidence, albeit slim, that 2 types—Hollow Red Dwarf and Spherical, Punched Feature head—were associated with one household group in the southern area and 2 other types were associated with a northern area of perhaps another household group. One cannot help but wonder if we have here two different kin-aggregate households with different clan symbols living side by side in the same hamlet. It might be added that the burned bones of an adult male and female were associated with the northern concentration.

Although we don't really know the social implications of this data and have only a glimpse of the more mundane activities of the people of Zone G¹, we do have a considerable amount of information about the chronological position of the year-round Occupation 3. Two radiocarbon determinations (I-901, I-895) (*Radiocarbon* 11:97) from the hearth area averaged at 1218 ± 108 B.C., and the percentages of pottery types from all areas are extremely similar to others of about the time of the end of Early Ajalpan. Of course, the large sample of artifacts shows Zone G¹ to have been a component of the Ajalpan Phase.

The Way of Life of Zone F and Zone E

The character of the stratum of Zone F was much like that of Zone G of Ts 204. Brown refuse 20 to 40 cm. thick without cultural features was probably the result of dumping from other living areas into the now shallow depression. However, this zone extended over all of our excavation, although the profiles of the peninsula to the west revealed that it died out at about the W4 or W5 axis. No equivalent stratum appeared in the clay pit wall 20 to 30 meters to the north, nor was the stratum found in Ts 204E to the northeast nor in Ts 204C to the southwest. Thus, the area of this occupation could not have been more than 50 to 60 meters wide north and south. Like Zone G¹ however, Zone F did have an equivalent in Zone E in Ts 204D some 60 meters east. This stratum, or one much like it, also occurred in the walls of the clay pit digging 50 to 75 meters still farther east. Thus, this occupation covered a linear area roughly 50 to 60 meters wide north and south and 125 to 150 meters long east and west, roughly at right angles to the Rio Salado.

Unfortunately, the only feature indicating a definite occupational area was a pit 2 meters in diameter in Zone E at Ts 204D which contained but few artifacts

to tell of the activities of a specific occupation. Most of the artifacts came from the dumping area, Zone F. Thus our interpretations of activities are for the linear hamlet as a whole and not a specific occupation or occupations within it.

Again there was considerable evidence that the people of the hamlet consumed meat; bones found were of at least 3 deer, a peccary, a dog, a turtle, and 3 cottontails. Although these, in conjunction with San Nicolas, Almagre, Garyito, Shumla, Pelona, Zacatenco, and Salado points, suggested hunting as an important activity, we lacked seasonally-sensitive bones to tell when they hunted. Evidence of butchering practices was equally poor, although the crude and fine blades, the thin and thick side-scrapers, and the many bifaces (such as flake choppers, blocky-core choppers, ellipsoidal choppers, discoidal choppers, thin crude bifacial knives, large and small bifacial disks, and some fine bifacial obsidian knives) could have been used in such an activity. Again, many bones (including 175 or so splinters) were charred and there were many fire-cracked rocks suggesting that roasting meat was common. The relatively few end-scrapers of the crude plano-convex, long flat flake, crude discoidal end-of-blade, and fine ovoid plano-convex types, as well as the split bone awl, the rounded antler needle, and the flat bone needle, indicated that the skins of the hunted animals may have been worked. Further, these bone tools and an antler hammer, a drilled deer scapula, and a rib pendant suggest some sort of bone-working industry. This antler hammer, the 20 pebble hammers, many flint chips, and cores (including some of the so-called choppers that were probably cores), as well as the chipped stone tools, indicate a type of flint knapping similar to that described for Zone H.

As in the previous occupations, evidence of a concern with vegetal materials was somewhat less prominent. We did uncover, however, muller-mano fragments, ovoid, oblong, spherical, and long lenticular cross-section and triangular cross-section manos, lipped saucer-shaped and oblong metates, an ovoid plano-convex metate, a cuboid pestle, a stone bowl fragment, a fragment of a boulder metate, and metate-milling stones.

Evidence of weaving and string-making was sparse: perforated sherds, disks, and the so-called rib pendant which could have served as a shuttle in a loom. Again there was but little evidence of trade in the obsidian, the volcanic tufa metates, the jade, the plug, the jade pendant, two sherds of Trapiche Dentate-stamped, and one sherd of Mapache Red-rimmed from the lowlands. Some of these imports were obviously of an

artistic nature; other objects, such as the discoidal shell pendants, slab paint pallet, and rubbed and polished pebbles, were local. The charred bone fragments of an adult male and female had been dumped rather unceremoniously into this refuse area.

Figurines or figurine fragments were extremely numerous and of a wide variety of types, as were those of Zone G, which also represented dumped refuse, probably from a number of different house areas. The figurines from Ts 204 included those of a dog effigy, a Squat "booted" leg and foot, one from a Hollow Red Dwarf, conical arms, and a Seated Trackwoman body of still another type, and legs of the Gingerbread variety. The pit of Zone E of Ts 204D yielded only a body fragment of Hollow Red Dwarf and a Standing Trackwoman.

As in the other zones of Ts 204 and Ts 204D, there were a large number of sherds used for a variety of purposes such as cooking, storage, decoration, and for eating. The assemblage from Zone F, however, showed a subtle difference from those of the previous horizons. Proportionally, bowls had increased at the expense of tecomates; Coatepec Plain and Ajalpan Plain were the dominant types. Two new types, Coatepec Buff and Coatepec Red-on-buff, occurred here. All of this suggests that we are dealing with a Late Ajalpan component (Occupation 4); the radiocarbon determinations averaging 915 ± 130 B.C. (I-923) and 1030 ± 130 B.C. (I-935) (*Radiocarbon* 11: 97, 98) tend to confirm this. The earlier of the two dates seems more correct in terms of ceramic trends than either the later one or the average of the two, 972 ± 92 B.C.

The Way of Life of Zone F¹ and Zone Super-E

Capping Zone F of Ts 204 in the southern part of our excavation was 5 to 10 cm. of a dark brown stratum of ash charcoal and fire-cracked rock. Extending down from it in Squares S3E5, S2E5-E6, and S1E5-E6 were three shallow refuse pits and a possible post mold at S2.2W.8. This whole southern area contained many burned pieces of clay of wattle-and-daub. Almost all the artifacts came from this southern area and we consider it to be some sort of wattle-and-daub habitation. Except along the 0, W1, W2, and E5 north-south axes, it gradually blended into Zone F below. It contained few if any artifacts or ecofacts, except for a concentration of artifacts in N2E5, N2E3, and E1, N1E4, and N1E3. Even there artifacts were mainly sherds, bones, and flint chips, as well as 2 mano and 2 metate fragments. Sherd percentages and the general soil texture suggest that Zone Super-E of Ts 204D was an extension of this Zone F¹ and perhaps part of the

same hamlet. If so, the hamlet would have been about 40 to 50 meters wide north and south and 100 to 150 meters long east and west.

Since almost all the artifacts and ecofacts came from the southern living area of Ts 204, our interpretations are of the activities of a single habitation or a single household group. The way of life of these people of this locus does not seem radically different from that described for the earlier Ajalpan floors.

Bones of two deer with unshed antler were found in conjunction with 12 projectile points of Abasolo, San Nicolas, Garyito, Shumla, and Salado—clear evidence of atlatl dart hunting during the dry season; but, if the ratio of 12 points to 2 deer is any indication, they must have been very poor hunters. The burned and cut bones of one or two dogs showed they used these domesticated animals for food. Roasting was still the most popular method of preparing meat. Most of the dog bones (as well as about 80 splinters) were burned, many in or near the burned rock-filled pit of Square S4E5. Much of the butchering was done elsewhere. In the cave we found mainly long bones, so we think that only limbs (and perhaps meat without bone) were brought back to this household. Their field butchering equipment might have been the blade, the thin flake scrapers, and the many bifaces and choppers. Evidently little or no bone working was done in this house, despite the single bead (made by sawing off a section of bird leg bone) and one unmodified antler tine (used as a flaker). The flake graver and the single examples of a crude ovoid, a long flake, a thin flake, a discoidal, a fine flat-topped, and a fine ovoid plano-convex end-scraper did suggest that the skins of the animals were worked.

We found many types of seed-grinding tools; muller and mano fragments, metate fragments, boulder metate-milling stones, ovoid mullers, an ovoid mano, spherical manos, ovoid plano-convex metates, long manos with lenticular cross-sections, a saucer-shaped and an oblong-lipped metate, and a long mano with trianguloid cross-section. There was some evidence that food, including the vegetal remains, was cooked in clay vessels. About an equal number of tecomates and convex bowls had carbon adhering to their interiors. It might be noted that few exteriors had adhering carbon. We do not know whether this was the result of an over-zealous sherd washer in our laboratory or of a change in the food preparation habits of our ancient inhabitants. Food and water storage seems to have been a very important part of their food preparation for rim sherds of ollas were just about as popular as of either bowls or tecomates.

Evidence of other activities was not so well marked; nevertheless, flint knapping seems to have been an important industry in this household. Most of the evidence occurred at the easternmost edge of the area. Here we uncovered 9 of the 15 choppers, all of the cores, and most of the flakes; all 11 of the hammerstones came from S3E5 and S4E5. One cannot help but suspect that many of the chipped stone tools from Zone F¹ were made in the southern house structure itself. Again, like Zone H, large flakes seem to have been made from cores (what we call choppers) with prepared platforms by percussion blows with heavy hammers. Some flakes were then fashioned into tools, such as the side-scrapers and end-scrapers, by pressure-retouching, perhaps with the antler tine. Other flakes for projectile points and bifacial knives were further percussion-chipped into blanks or preforms (the Abasolo point and 2 fragments of thin bifaces) perhaps by our 3 smaller hammers, and then pressure-flaked into their final form. None of the fine blades were made in this house area as we found neither polyhedral nuclei nor waste obsidian chips. Perhaps they were imported along with the jade ornaments, the grinding stone of volcanic tufa, and the Ponce Black, Mapache Red-rimmed, and Trapiche Dentate-stamped pottery from the nearby Gulf Coast.

Evidence of other household activities was poor. A single paint dish, perhaps for some artistic endeavor, a single unperforated sherd disk, and a piece of polished mammoth tusk for some unknown purpose were uncovered. Again, there were many figurine fragments (13) from at least 8 whole figurine specimens. Three Hollow Dwarf heads and 2 Hollow Dwarf arms from at least 4 different Hollow Red Dwarf figurines occurred. One other arm fragment occurred in Square S3E5. The other arm fragment occurred in S4E3, as did a Spherical Head and a conical arm fragment. The rest of the figurine fragments—2 Standing Trackwoman bodies, a Gingerbread and a long cylindrical leg fragment—came from Square S4E4. The latter specimens could have all come from a single type, represented by 4 specimens, with Spherical, Punched Feature heads attached to Standing Trackwoman bodies with conical arms and Gingerbread or long cylindrical legs. Thus, of the 12 possible figurine head, body, and limb combinations which could have existed in Late Ajalpan—1) No Face with Standing, or 2) Seated Trackwoman bodies, 3) Projecting Eye head with large solid bodies and limbs, 4) Flat, Punched Eye heads with Standing, or 5) Seated Trackwoman bodies, or 6) Gingerbread Standing, or 7) Seated bodies, 8) Spherical, Punched Feature head with Standing, or 9) Seated Gingerbread



Fig. 66. The base of the burial pit of Ts 204C, as viewed from the northwest.

bodies, or 10) Standing, or 11) Seated Trackwoman bodies, and 12) Hollow Red Dwarf head and bodies—we found 8 whole specimens of only two of these many combinations in 3 adjacent one-meter squares. Obviously, this was no random distribution in space in terms of the 2 types utilized by people in that part of their living area. It would certainly appear that these 2 types, representing some sort of cult deity, clan symbol, or kin-aggregate sodality, were connected with a specific kin-aggregate group that existed in the specific house area in the southern part of Ts 204. Again, it would have been better if we had more similar data from other household areas in the hamlet of Zone F¹. This pattern of certain specific figurine types occurring with specific household areas of a specific occupational component occurred in the previous Floors H and G¹ of Early Ajalpan, and, as we shall see, concurs in the Ajalpan Floors K³, K², and K¹ of Coatepec. Our interpretation of this pattern may not be correct; nevertheless, there is some sort of specific social significance here.

Although we do not feel overly secure in our interpretation of Occupation 5 of Zone F¹, our classification of it as an Ajalpan component in the late part of that phase is based on the large amount of ceramic and

non-ceramic data. Further, the radiocarbon determinations of 1090 ± 300 B.C. (I-927), 1050 ± 350 B.C. (I-752), and 800 ± 130 B.C. (I-924) (*Radiocarbon* 11:97, 98), which average 980 ± 157 B.C., from the house area confirm such a temporal estimate.

The Way of Life of Zone E and Zone D

Zone E of Ts 204, a yellow-brown refuse layer 10 to 30 cm. thick, occurred only in the southeast corner of our excavation roughly in a triangle bounded by Squares N3E5, S5E5, and S5E1. It would seem it once covered the whole area of our excavation, but became eroded by some sort of water action to the west when the channel, some 10 to 40 cm. deep, was filled by fine varve-like waterlaid silt and sands, called Zones D and C of Ts 204 and Ts 204C. We divided the silt into 2 zones because they were divided by a small burned area containing a few sherds—not a real occupation, just a dumping of refuse. The silts above the burned area were designated Zone C and the burned layer and silt below it was called Zone D. Thus, Zone E was very limited, but along the S1 and S2 axes from E2 to E5, it was capped by a burned floor, revealing it to be a true occupational deposit. Sherd percentage of Zone E of Ts 204 and Zone D of Ts 204D suggest these two zones were perhaps of the same time period and that there was a hamlet covering roughly an area some 100 meters long and 20 to 40 meters wide.

Since only sherds and no artifacts came from Ts 204D and very few artifacts and ecofacts came from Ts 204, there is little we can say about the way of life of this so-called hamlet. The charred bones of 2 deer suggest they ate the roasted meat of hunted deer. We found no projectile points. Perhaps the skins were worked, as we found a long flake and an end-of-blade scraper. We uncovered a split bone and metapodial somewhat confirming the idea of skin working and suggesting bone working as well. Seven muller-manos, 3 ovoid mullers, 2 long manos lenticular in cross-section, and a basin-shaped metate suggest vegetal food was prepared. Only one convex bowl had interior carbon adhering, suggesting cooking. Most sherds were too badly worn to determine how they were used. Seven hammerstones and many flint chips indicated flint knapping, and the abrader saw, square-polled celt, and impressions of sticks and logs in the burned fragments of wattle-and-daub indicated woodworking and house building.

Thus, the few artifacts and ecofacts tell little about the activities of Occupation 6 and allow only a tentative classification as a Late Ajalpan component, roughly in the period from 1050 to 850 B.C.

The Way of Life of Zone C¹ and Zone C

The final Ajalpan occupation or occupations of the site was extremely ill-defined and represented by only a few artifacts. Zone C of Ts 204D, a 20-cm. yellowish layer, seemed to have been part of it, as were the few sherds lying on the bottom of varved Zone D of Ts 204. Perhaps the unanalyzed sherds from Ts 204A some 200 meters northeast of Ts 204 and the intrusive bell-shaped burial pit in Ts 204C (Zone C¹) were parts of this final Ajalpan Occupation 7. All these test excavations yielded pottery classified as Late Ajalpan, but not enough artifacts or ecofacts to add much to the reconstruction of their ancient way of life. The exception is the pit in Ts 204C. It told something special of a way of life of Ajalpan people that did not occur in other components (Fig. 66).

This component seemed to pertain to the ceremonial and social life of the Ajalpan peoples. The large bell-shaped pit was dug about a meter deep into the soils of the high terrace (Zone I) through laminated sediment like Zone C of Ts 204. The mouth of the pit was about 50 cm. in diameter and the more or less level bottom was over 2 meters in diameter; the center of the 2 diameters was located at N1E2.5 (Fig. 63). Slabs of rock, including some mano and metate fragments, lay on the floor of the pit and partially covered most of its southeast quadrant. Also, in this southeast section 3 large slabs about 30 cm. long stood upright, roughly parallel to the side of the pit, about 40 cm. from its edge. A third slab closed off the west end of this niche, roughly at a right angle to the line of slabs and the edge of the pit. A large Hollow Red Dwarf figurine about 40 cm. high stood upright in the pit, and a long mano, lenticular in cross-section, was set upright against the back legs of the figurine. Next, a fine film of charcoal, perhaps from some ceremonial fire, drifted into the pit covering the toes of the figurine and the rocks and the floor of the niche to the southeast. Shortly thereafter, and this could have been merely a matter of hours, the body of an elderly male was placed in the niche on his right side in a tightly-flexed position with his back to the edge of the pit, roughly facing the figurine. Near its feet was placed a stone bowl containing red hematite. Evidently, the pit must have stayed open for some time, for there was a one-inch layer of silt or windblown dust over the rock and charcoal on the pit's floor, as well as over the feet of the figurine. After this period of "lying in state" refuse was dumped into the pit (Zone Z) breaking the figurine and crushing the body of the elderly male. After the pit had been filled to a depth of about 30 cm., a

5-cm. layer of ash either was dumped into the pit or was the result of some sort of ceremonial fire made in the filled pit (Zone Y). Be that as it may, the rest of the pit was filled with more refuse from some contemporaneous living area (Zone X). Most of the artifacts recorded for Ts 204C were part of this refuse, and, of course, represented other activities not connected with burial rites.

During our excavation of the pit we facetiously referred to it as "that ceremonial pit for the burial of that high priest of the Red Dwarf Olmecoid cult (or ruling lineage)." As has been often stated, "Many a truth is said in jest" and we believe our statement made a better interpretation than it did a good joke.

Regardless of how near to the truth our interpretations may have been, the sherds from the fill allowed us to classify the pit as of Late Ajalpan times. A radio-carbon determination from the charcoal over the partially-paved floor was dated at 900 ± 190 B.C. (I-767) (*Radiocarbon* 11:97).

Zone A and Zone B

The final part of our stratigraphic column in the Ajalpan clay pits was a 1-meter-thick layer of yellowish colluvium. This stratum was evidently some sort of "sheet wash" deposit that gradually covered the whole site. At about 50 cm. depth was found in parts a thin deposition of sand and gravel which was the basis for our dividing it into Zones A and B. The occurrence of only Late Santa Maria sherds and artifacts in the deposit indicate that this colluvium was laid down in that time period or shortly thereafter.

The Coatepec Site

The Coatepec site is just south of the clay-pit operations of the nineteen-sixties which played an important part in our uncovering the Ajalpan sites; more precisely, it is about 2.4 to 2.6 kilometers south of Ajalpan and 100 to 400 meters east of the Rio Salado where the Las Canoas aqueduct crosses the river. The size of the site is some 300 meters long and about 200 meters wide. A large amorphous mound or mounds dominate its east end, and to the west, sherds cover a series of low ridges and the surrounding corn or cane fields. The site was discovered during the fall of 1961; however, it was not until the time of the excavations at Ajalpan in the spring of 1962 that Peterson got around to a careful survey and intensive sherd-collecting. By this time, excavations at the Ajalpan and Las Canoas sites, surface collections of other remains in the valley, and comparative data from Monte Alban in Oaxaca and Chiapas, had given us a fairly good



Fig. 67. View of Ts 368 from the west, with Ts 368w trench in foreground. Ts 368e test is indicated in background.

idea of the sequence of pottery types during Formative or Pre-classic times. When initial examination of sherds from one low ridge (about 120 meters long and 50 meters wide north and south) in the southwest portion revealed all the Formative pottery types we knew, we were sure we had found a diggable site. What is more, the ridge itself looked like a huge midden or tell which might have had all the pottery types in a good stratigraphic context. Thus we decided to dig into this ridge at Ts 368.

Testing, however, had to await the completion of our excavations at Ajalpan (Ts 204) and Las Canoas (Ts 367), and did not begin until May 28 under the direction of F. Peterson with A. Arbide as his assistant and field-work supervisor. Initially, two small hillocks on the east end of the site were chosen for testing. Test 1 was a 1-by-1-meter square that was later expanded into a 3-by-2-meter square (as Tests 1 and 3) and called Ts 368 west. This part of the site was 51 meters west and 5 meters south of a 1-by-2-test, Test 2, in an area that later was to be called Ts 368 east. On the second day of excavations, when the tests were

some 3 meters deep and headed for a depth of 6 meters, MacNeish made an inspection trip to the site to plan future digging, as he was about to leave for Canada and the Yukon to fulfill his duties as Chief Archaeologist of the National Museum of Canada. After some discussion between the authors about the two tests, both of which had beautiful stratigraphy and obviously could give the Formative ceramic sequences desired, it was decided to concentrate on the eastern area of pure midden and stratified floor deposits. Furthermore, in Square 3 of Test 1 appeared the edge of a pyramid and we knew we were not equipped to take on that sort of architectural archaeology. Therefore, Arbide was instructed to map the area and set up and stake a 5-by-10-meter grid in Ts 368e so that Peterson could intensively dig that area. Peterson hoped not only to obtain good ceramic stratigraphy, but also to acquire some information about the way of life on each of the easily defined floors which by then were given zone designations. Good field notes and field drawings in our usual system supplemented with many photographs could have giv-

en us considerable valuable information about life in the Formative. As far as excavation in the west was concerned, Test 1 was integrated into our grid system as S4W50 in case any other digging was done in that area; however, as mentioned, our general intention was to not get into that kind of a dig that we really could not handle. In short, this was pretty much the way MacNeish left things when he returned to Canada. As will be seen, future developments in these excavations gave proof to the old adage that hell is paved with good intentions.

Excavation in Ts 368e began with a trench between the N2 and N3 axes from E6 to W7. The squares here were dug alternately to a depth of one meter and then the in-between squares were removed until there was a trench thirteen meters long and one meter wide. Notes were quite good, profile drawings of each square were fairly accurate (although the originals had disappeared), and many photographs were taken of one of the features, a series of post holes in Squares N2 and N2W1. Because of this feature, Squares N1, E1, and S1E2, and S5E2 were excavated to a depth of one meter. Carefully-drawn floor plans which cover a wide area without lens distortion would have been an excellent supplement to photographs like those of the post holes. Unfortunately, in this case no such drawings were made, or if they were they never got back to our headquarters—shades of things yet to come.

In the meantime, the initial trench was taken down to the 2-meter level by the same alternate-square technique and then to the 3-meter level. For convenience in hauling the dirt out of this ever-deepening trench, a few alternate squares were taken out of its north side and later some came out of its south side. Up until this time, what might be called "phase 1", the field notes were mediocre, the profiles only fairly accurate, the photography good, and the crew of modest size; then, about July 1st a knee injury and administrative duties kept Peterson away from the dig most of the time, and field operations were left solely in the hands of his student assistant who, for a short time, was joined by still another student.

These circumstances initiated "phase 2" of their field techniques. The control trench of Ts 368e was now stepped down to the 4-meter level, to the 5-meter level, and finally to sterile soil just below the 6-meter level (Fig. 68). Also, alternate squares were dug north and south of this trench, and the in-between squares later removed so there were two parallel trenches on the north and south sides of the main trench. While the materials were accurately bagged as to zone and the



Fig. 68. Coatepec east (Ts 368e). East-west S1 profile, as viewed from the north.

long east-west profile was quite accurately drawn, and while Peterson was indeed able to come out and take an occasional photograph, the north-south profiles were poorly drawn, the square descriptions were abbreviated, and the daily diary of operations had ceased. Further, as one of our visitors observed, the bottom of the 7-meter-deep trench was as dark as the black hole of Calcutta and it was physically impossible to discern cultural features. None were recorded even though they showed up in the east-west profiles. Also, adding to the debacle, our field assistant had doubled the size of the crew and once again began to dig in Ts 368 west. Whether the unsolicited help was due to youthful enthusiasm or whether commanding such a large crew had given our young aide-de-camp delusions of grandeur is difficult to decide, but, as far as field techniques were concerned, things went from bad to worse. Ts 368 west was dug in a series of squares of varying size, usually not mentioned in the notes, roughly paralleling the side of the pyramid. A few drawings were made of the profiles, but the stakes were not tied into the grid system, nor was a map made of the square localities or pyramid features. Only by dint of Peterson's photographs were we able to reconstruct the location of Tests 1 to 18 in Ts 368w, and we won't



Fig. 69. Steps (in foreground) on the south edge of the pyramid at Ts 368w, as viewed from the southeast.

vouch for the accuracy of our interpretations (Fig. 69).

The final "phase" of the excavation began in late July, about the time that Ts 368 east had been dug to a 5-by-10-meter trench (N4 to S1 and E5 to W5) down to sterile soils at a depth of about 6 to 7 meters and the trench in Ts 368w had meandered off to the west through Test 15 and stopped about 25 meters away from where it had started. When the crew size was again increased it could be seen that increasing numbers of workers had been in direct proportion to decreasing amounts of records. During our final "phase"

we reached the limits of such an equation, for there were by then more men digging than one student assistant could direct, while the recording of the operations had decreased to the point where the drawings and field notes were completely useless, in fact, almost non-existent. Fortunately, Peterson was still taking photographs of the operations and Fred Johnson reopened the Ts 368e trench in 1964 so the more southerly profile could be redrawn. It was also fortunate that all operations ceased in August, albeit about 10 weeks too late. By that time the monster in the east had reached dimensions of about 5 meters wide, 11 meters long, and over 6 meters deep and the trench in the west had snaked its tortuous way some 50 meters off in the direction of the setting sun.

However, in spite of this technical fiasco, considerable useful information is available from these two sites, thanks to analytical studies. Two of these studies concerned chronology. One was undertaken by MacNeish and Nelken in 1963 when they studied the large sample of the pottery and ceramic attributes from the 17 stratified zones. This study resulted in a number of pottery types as well as artifact types that were excellent time markers for the Formative Period. Comparisons of these types from this sequence with those from Ajalpan, Las Canoas, Quachilco, and Purron allowed us to relate the occupations to each other temporally and to classify the various stratified zones and components of Coatepec into their phases and sub-phases. Zones K³, K², K¹, and J were found to be Late Ajalpan occupations like the upper zones of the Ajalpan site. Zones I through C¹ were of the Early Santa Maria Subphase like zones of Las Canoas, Quachilco, and Purron Cave, and the upper zones (except Zone A which was of Venta Salada times) were Late Santa Maria like most of the zones of Quachilco as well as those of other sites. Of course, such studies also allowed us to correlate the zones of the butchered Ts 368w site with the upper Late Santa Maria zones of Ts 368e.

These ceramic studies were in large part responsible for the second study, Fred Johnson's rather intensive investigation of the chronometrics of Coatepec, using radiocarbon determinations. From his re-opening of the south trench of Ts 368e, he was able to obtain about 50 carbon samples and 26 Carbon-14 dates, only 3 of which seem invalid. These dates confirmed both our typological studies and the physical stratigraphy of the site. The sequence is summarized in Table 8.

Opening the big trench also assisted our studies of the way of life of each component. It allowed us to

T A B L E 8
Sequence in the Coatepec Site (Ts 368e, Ts 368w)

	Ts 368e	Ts 368w	
	<i>Venta Salada Phase</i>		
	Zone A	Zone A	1300-1500 A.D.
	<i>Late Santa Maria Subphase</i>		
	Zone B ¹	Zones B and B ¹	150 B.C.-0 A.D.
Occupation 13	Zone B	Zone C	250-150 B.C.
Occupation 12	Zone C-1	Zone D	400-250 B.C.
Occupation 11	Zone C	Zone E	550-400 B.C.
	<i>Early Santa Maria Subphase</i>		
Occupation 10	Zone C ¹		650-555 B.C.
	Zone C ²		675-575 B.C.
Occupation 9	Zone D		725-625 B.C.
Occupation 8	Zone E		750-650 B.C.
Occupation 7	Zone F		775-675 B.C.
	Zone G		800-700 B.C.
Occupation 6	Zone H		825-725 B.C.
Occupation 5	Zone I		850-750 B.C.
	<i>Late Ajalpan Subphase</i>		
Occupation 4	Zone J		950-750 B.C.
Occupation 3	Zone K ¹		1000-800 B.C.
Occupation 2	Zone K ²		1025-825 B.C.
Occupation 1	Zone K ³		1050-850 B.C.

analyze and correct the S1, E5, and W6 profiles and to discern actual hearth areas, burned floors, and other architectural features in the various strata. These data considered in conjunction with the distributions of features, ecofacts, and artifacts and with knowledge of the possible use and functions of each, gave us some basis for reconstructing the cultures of the occupants of the various zones. Unfortunately, our tests were of only small portions of these ancient communities and thus merely hinted at life in these hamlets or villages. The data concerning aspects of their ancient social structure is provocative rather than conclusive. Nevertheless, some of it may be a basis for testing in future investigations, and we hope that one of these days an investigation will take place in Coatepec itself, with somewhat better field techniques. For the present, however, we have reconstructed life in the various components with what data was gathered and have computer plots for most of the occupation floors. As in previous sections, we shall begin with the earliest occupation.

The Way of Life of Zone K³

We came upon the earliest occupation zone between 6 and 7 meters below the surface where it overlay and blended into the light yellow clayish alluvial subsoil of Zone L. Zone K³ varied in thickness from 5 to 60

cm., averaging about 40 cm., with a general tendency to be thinner or even non-existent in the northwest part of the trench and thickest to the east. It also varied considerably in color; the stratum, heavily stained with charcoal in the southeast corner of the excavation, turned to dark brown to yellow as one proceeded northwest. Generally speaking, the lower portions of the stratum were lighter in color and often were difficult to distinguish from the underlying subsoil, except that the latter was usually more compact and was sterile of human remains. The top of Zone K³ was, however, quite distinct in its more reddish color. The portion of it uncovered by Johnson along the S1 wall revealed a definite burned floor oven and the profile of other parts note ash on it or along certain profiles on the top of it, although the meager notes say not a word about this matter.

We could not determine the total extent of the zone from our 5-by-11-meter trench, but in the bottom of Test 1-3—over 45 meters to the west at a depth of 5 to 5.4 meters—there was similar brownish stratum blending into the yellowish subsoil. Also, the 50 sherds from this stratum (called Levels 24 and 25 of Test 1-3) were much like those of Zone K³, and the sherds, figurines, and soils in Test 1-3 in Levels 22 and 23 were very much like those in Zones K¹ and K² of Coatepec east. For this reason we assumed that K³ extended at least 45 meters west of our main excavation and that, in all probability, Zone K³ represented the occupational zone of a fairly large linear hamlet (at least 50 by 100 meters) which was oriented east-west roughly at right angles to the Rio Salado (Occupation 1).

Confirming this hypothesis was the wattle-and-daub from houses and the two concentrations of artifacts in two areas with much charcoal and burned floors. The more distinguishable concentration of artifacts and burning occurred in the south-central part of our excavation and was roughly rectangular in shape, about 4½ meters long northwest-southeast and with a maximum width of about 2½ meters. Most of the artifacts and a large proportion of the figurines and sherds came from this burned patch. In Square S1E1, Fred Johnson uncovered part of a hearth as well as many burned wattle-and-daub wall fragments. We found no post molds or post holes in this area. Digging in the dark as they did, and with their "skill", it is quite possible that the crew would not have recognized a post hole if they fell in one. In any case, we believe this area represents the floor of a roughly rectangular wattle-and-daub house, referred to as House 1 (Fig. 72).

The other concentration of the rest of the figurines,

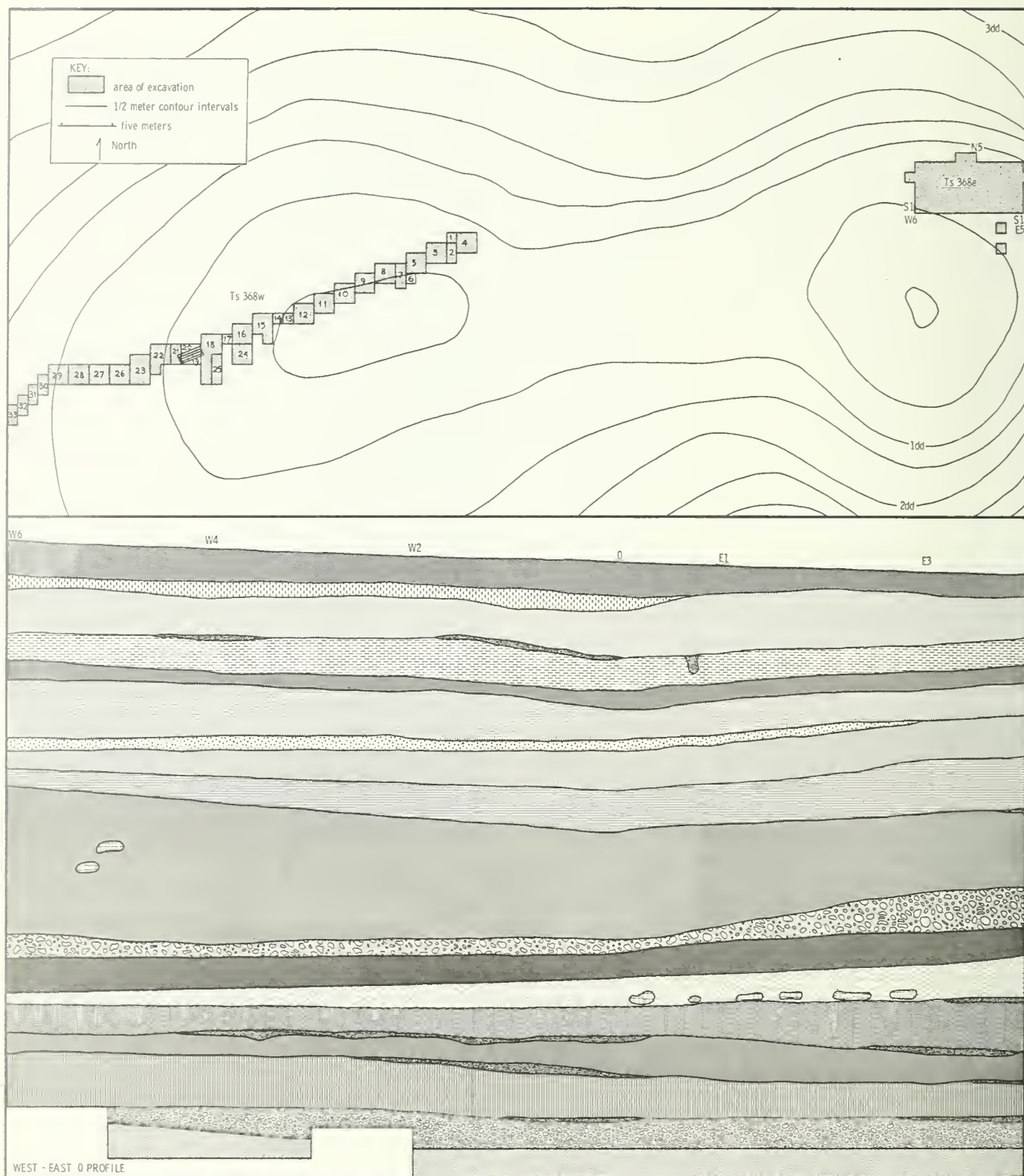
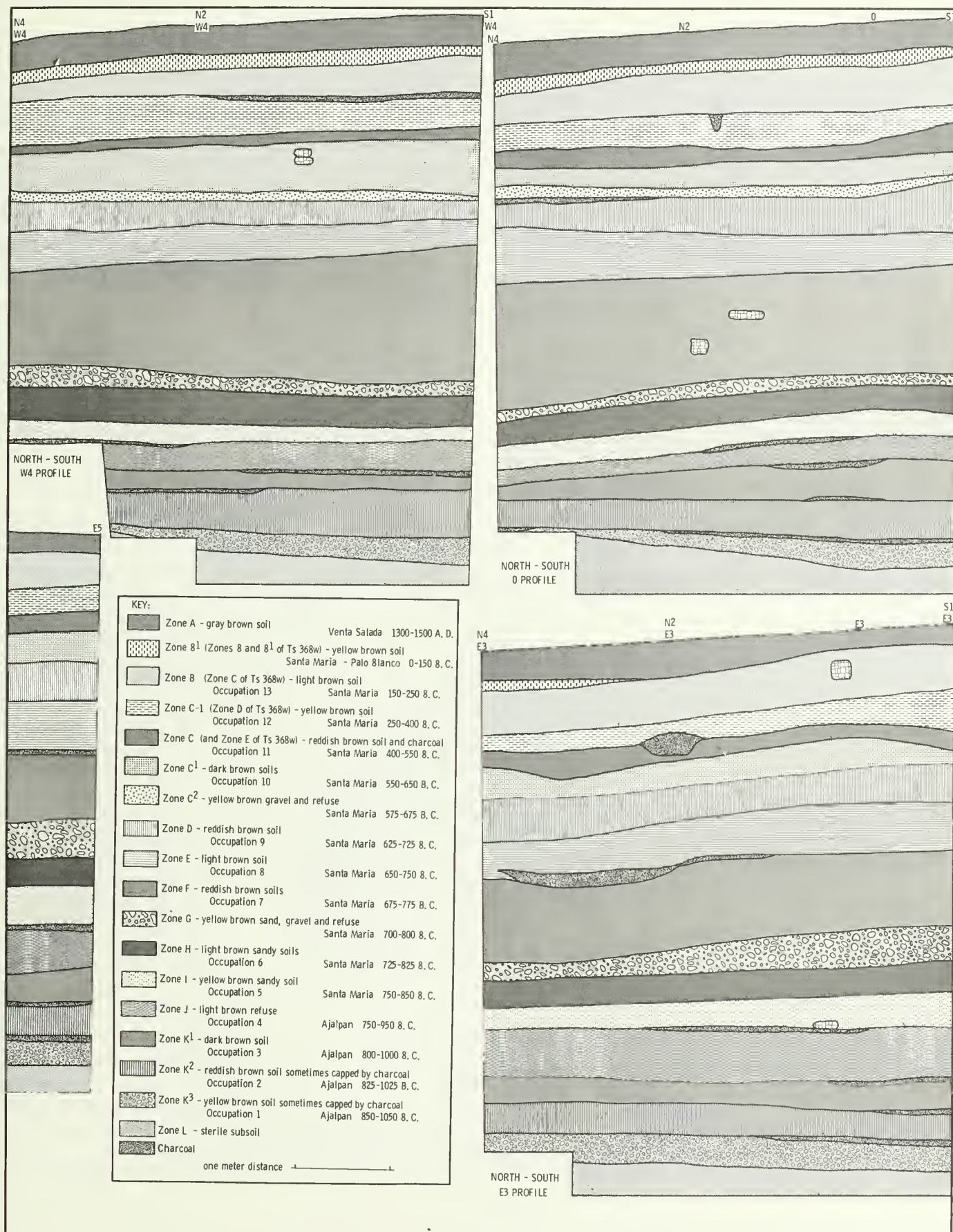


Fig. 70. Contour map (top) of Coatepec site and west-east 0 profile (bottom), and north-south W4, 0, and E3 profiles (facing page).



(Fig. 70 continued)

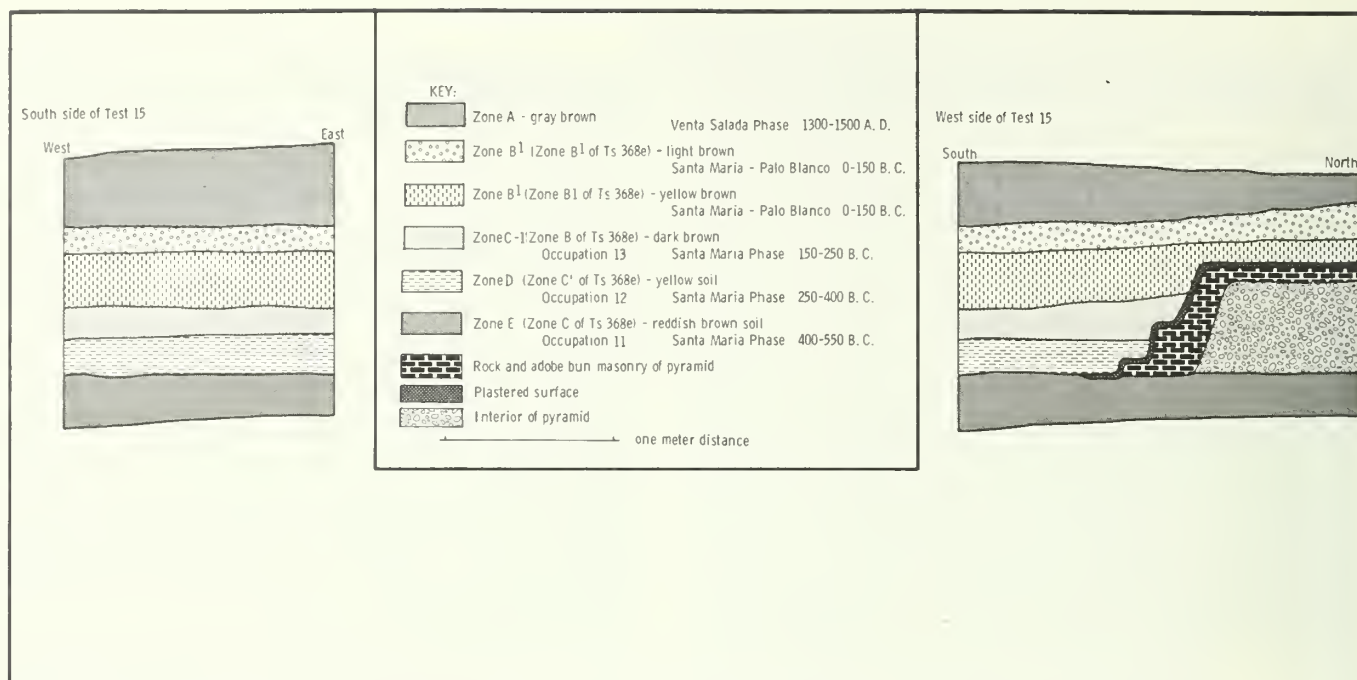


Fig. 71. Ts 368w west-east south profile of Test 15 (left) and south-north west profile of Test 15 showing a cross-section of the pyramid (right).

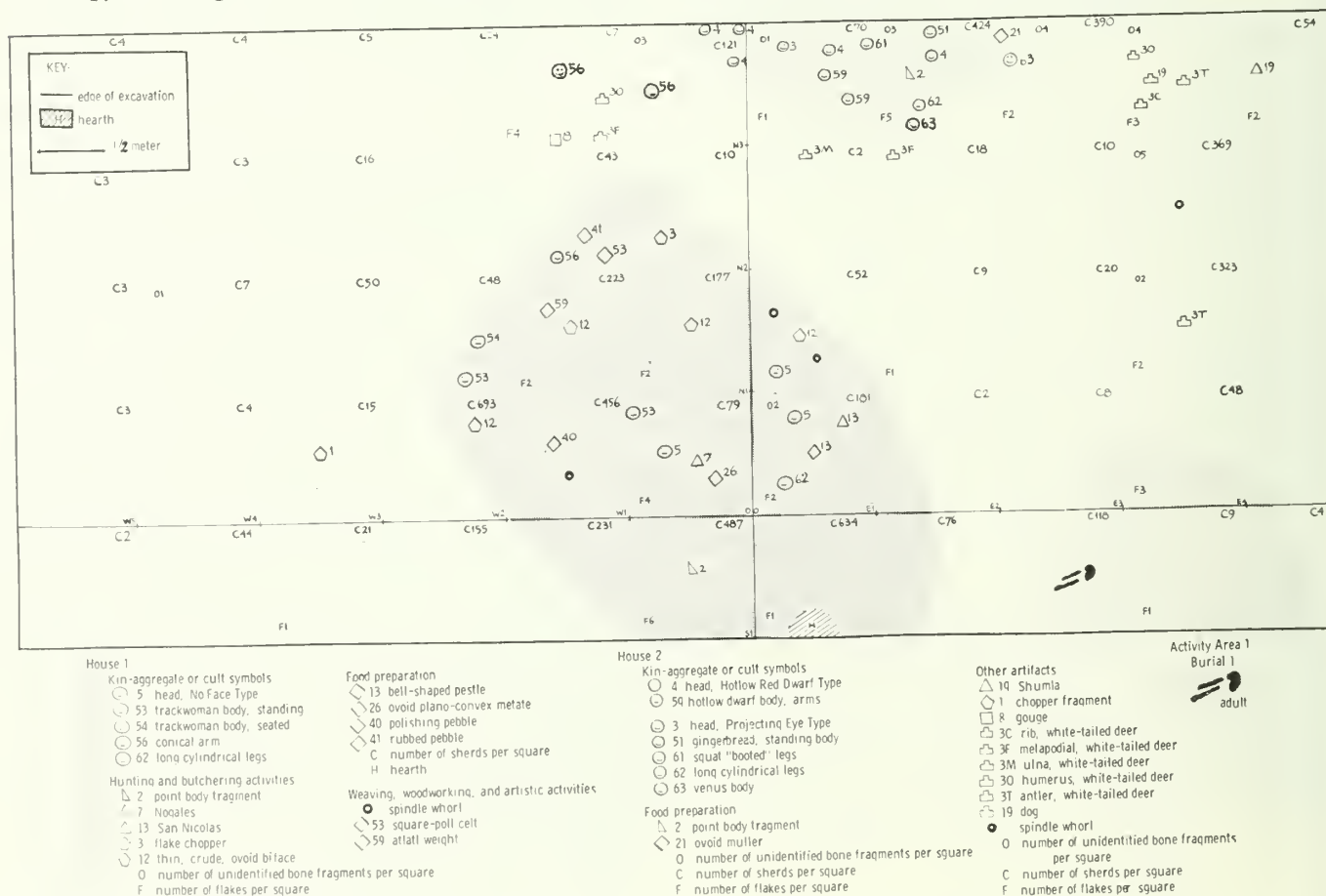


Fig. 72. The activity and house areas of Zone K³ of Ts 368e with a key to their ecofacts, artifacts, and burial.

most of the other sherds, some flakes, a core, and artifacts was also associated with a burned floor area. This area was roughly triangular with its right angle apex at N3E1 and its hypotenuse along the north wall of our excavations. Although no post holes were uncovered, we believe this area represents the southern corner of a northwest-to-southeast-oriented rectangular wattle-and-daub house, the other portions extending northward into the undug area. This tentatively identified a portion of a structure we have designated as House 2.

A charcoal and burned-rock area in the southeast portion of our trench (about 3 meters in diameter and some 40 cm. deep) was, we believe, some sort of roasting pit (Activity Area 1). The only evidence we had concerning what may have been roasted there were a few burned cranial fragments of a human adult.

The relative thickness of Zone K³ suggested a more or less sedentary occupation, as did the remains of what we call houses. Some of the artifacts and ecofacts tended to confirm this suggestion; for example, we uncovered both ground-stone tools that could have been used to grind seeds of the wet season and deer antler, diagnostic of the dry season.

It is significant that the only remains of a seasonally-identifiable animal—the deer antler—were of the dry winter season. This osteological information, including the Shumla, San Nicolas, and Nogales points, suggested that this was the winter subsistence activity, and the mullers, pestles, and metates suggested that agriculture was the wet-season activity. One might guess further that agricultural produce may have been a major food at all seasons, whether fresh from the fields during the summer and fall or taken from storage during the winter and spring. We might infer from this that these Ajalpan people were not full-time agriculturists and thus were not involved in “effective food production”; rather, they were wet-season barranca agriculturists undertaking what might be called “subsistence food production.”

The deer limb bones suggest that butchering was usually done elsewhere; however the thin ovoid bifaces and the flake chopper in House 1 and the gouge in House 2 indicate that some of it may have been done at home. Burned bone suggested meat was roasted, perhaps in the rock-filled pit (Activity Area 1).

The pestle, muller, and metate indicated that vegetal food (mainly corn) was ground. We suspect that much of the food was cooked in pots, as sherds from at least 10 long-neck ollas of Ajalpan Coarse Red and one long and one short-neck olla and a hemispherical bowl of

Coatepec Plain had carbon adhering to their interiors. There were probably more sherds with similar adhering carbon, but overzealous sherd washers (without the necessary supervision) scrubbed away the evidence and the field notes of Ts 368e, consistent with their other shortcomings, say little about this matter. In any case, fragments of at least 135 ollas, 76 bowls, and a tecomate did occur. These probably served for cooking, storage, and water-hauling, and as eating dishes. Most were undecorated and included fragments of a long-neck olla of Purron Plain; a plain and a pumpkin-shaped tecomate and 2 long and 2 short-neck ollas of Ajalpan Coarse; a convex-wall, a flaring-wall, and an incurved-rim bowl of Ajalpan Fine Plain; at least 2 plain, 1 ellipsoidal, and 1 pumpkin tecomate, 22 short-neck and 7 long-neck ollas, 3 convex-wall, 1 incurved-rim, 2 flaring-wall, and 2 outslipping-wall bowls of Ajalpan Plain; 14 short-neck, 12 long-neck, and 6 funnel-neck ollas, a plain, an ellipsoidal, and a pumpkin-shaped tecomate, 12 convex-wall, 1 incurved-rim, 6 flaring-wall, and 7 outslipping-wall bowls of Coatepec Plain; and 2 long-neck, 2 short-neck, and 1 angle-neck olla and 3 convex-wall, 4 outslipping-wall, and 1 flaring-wall bowl of Coatepec Buff. Sherds with red paint on them consisted of at least 1 bowl of Ajalpan Fine Red and 31 long-neck, 20 short-neck, 2 funnel-neck, and 2 beveled-lip ollas and a convex-wall bowl of Ajalpan Coarse Red. Only the Coatepec Red-on-buff sherds could actually be considered decorated; these were represented by 20 convex-wall, 2 flaring-wall, and 1 outslipping-wall bowl. The 2 trade sherds, 1 Mapache Red-rimmed and 1 Tlatilco Mottled bottle, were also decorated, but these, of course, were not locally made. Thus, of the 215-odd resident vessels found, 125 were totally undecorated, 57 were smeared with red paint, and only 23 were decorated. Not only was our ceramic complex, with ollas dominating over plain bowls, functional in use, it was also boringly plain, implying that the ceramics were predominantly utilitarian and that the inhabitants of K³, like those of Zone J of Purron Cave with a similar pottery complex, were villagers with no special status—the common man, if you will.

Other activities were hard to recognize; however, 2 fine flat-topped end-scrapers (not located for the floor plot) suggested skin-working and 30 flakes of flint and 3 of obsidian suggested some flint knapping. Only two flakes had striking platforms and both of these were prepared. The 4 fragments of sherd disks, possible spindle whorls, and the impression of a one-over-one textile on a sherd of Canoas Heavy Plain indicated that the inhabitants probably did some weaving on simple belt looms. The celt and gouge suggest wood-

working, perhaps cutting poles used in house construction.

Only a few objects were suggestive of activities that were not mundane: a fragment of a jade pendant and teeth, a piece of maxilla, and the frontal bone of an adult human. However, the pendant was not well finished, and the human bones occurred in the southeast roasting pit where we believe they had been dumped. The 22 figurine fragments are, however, another matter, and their spatial distribution had special significance. Each one of them can be associated with one of the two houses. In or next to the larger more complete House 1 were all three of the No Face heads as well as the Seated Trackwoman body, the 2 fragments of Standing Trackwoman bodies, the long cylindrical leg, and a fragment of short conical arm. As has been stated in Volume 3, it is probable that No Face heads were attached to Trackwoman bodies which in turn usually had conical arms and cylindrical legs. Thus, all the figurine fragments from House 1 were probably of the same figurine type. Matching the heads with the bodies suggests that there were at least 5 different No Face figurines, since only one of three heads, in terms of size, could possibly go with but one of three bodies.

Associated with the southwest corner of House 2 in Squares N3, N3E1-N3E2, and N3E3 were all the rest of the figurine fragments. The majority of these, 5 heads and 2 arms, were from Hollow Red Dwarfs, probably at least 3 whole figurines. The other figurines consisted of a Projecting Eye head, a small part of Standing Gingerbread body, 2 Venus bodies, 2 conical arms, and a Squat "booted" leg and could have come from at least 4 and possibly 5 solid figurines with Projecting Eye heads and Gingerbread or Venus bodies, conical arms, and booted feet, since the head, 3 bodies, and 1 arm were all of radically different sizes. Thus, the second house probably had 2 or possibly 3 figurine types in it, radically different from House 1.

There was an extremely high correlation between certain figurine types and certain houses. What is the significance of this data? First of all, there seems little doubt that individual figurine types were connected with certain houses; or, to put it socially, that individual household groups were connected with specific entities represented by figurines. We believe it is fairly logical to assume that groups living in these relatively long houses were probably kin-related or aggregates of people of a single lineage, moiety, clan, or the like. Thus, the individual figurine types, or what they represent, were connected with kin-aggregates or lineages. Now what do the figurines represent—artistic whims of individual households or kin-aggregates, cult deities

of households or kin-aggregates, or artistic manifestations in clay representing sodalities of kin-aggregates, i.e., clans, lineages, or the like, or some other sort of relationship of the various choices? We believe they were representations of either cults or sodalities. The figurines were not associated with specific ceremonial locations or features; they occurred in households of people without specific high status, and the individual specimens were of a considerable range of artistic features and sizes. Therefore, we do not believe it likely they represented deities but rather they were symbols of sodalities of some sort of kin-aggregates. The fact that 5 of the 6 figurine bodies were female—the Gingerbread being impossible to sex—also indicates that symbols or sodalities had some sort of female or "matri-" connections. Unfortunately, on the basis of our present knowledge, we cannot determine exactly what this linkage was, but we cannot help but wonder whether or not these kin-aggregate groups were matrilineal or matrilocal or perhaps fertility-oriented.

In terms of artifact types, there is little doubt that Zone K³ must be considered a component of the Ajalpan Phase. The proportions of pottery and figurine types of Occupation 1, when compared with other Ajalpan components, reveal that it was probably in the late part of the phase, roughly contemporaneous with the Carbon-14-dated pit component of Ts 204C. Thus, we estimate that Zone K³—a stratum representing a hamlet composed of households of kin-aggregates using a material culture we classified as Ajalpan—was laid down in the time period from about 1050 to 850 B.C.

The Way of Life of Zone K²

We distinguished this zone from the yellowish Zone K³ by its sandier soil and its uniformly darker color with a tendency toward reddish-brown. In thickness, it varied from 10 to 60 cm., averaging about 30 cm. A similar stratum with almost the same proportions of pottery types and figurines occurred in Test 1-3 about 45 meters to the west. A study of the profiles suggested that three patches of ash capped Zone K², and plotting the artifacts revealed three concentrations that roughly correlated with these ash floors. These three concentrations of artifacts and ecofacts, including many fragments of burned wattle-and-daub, are considered to be the remains of houses, which we have numbered from southeast to northwest, House 1, 2, and 3 (Fig. 73), and which represent the remains of a linear hamlet.

The most poorly defined of these was House 1 which may have extended east of our excavation area. Activi-

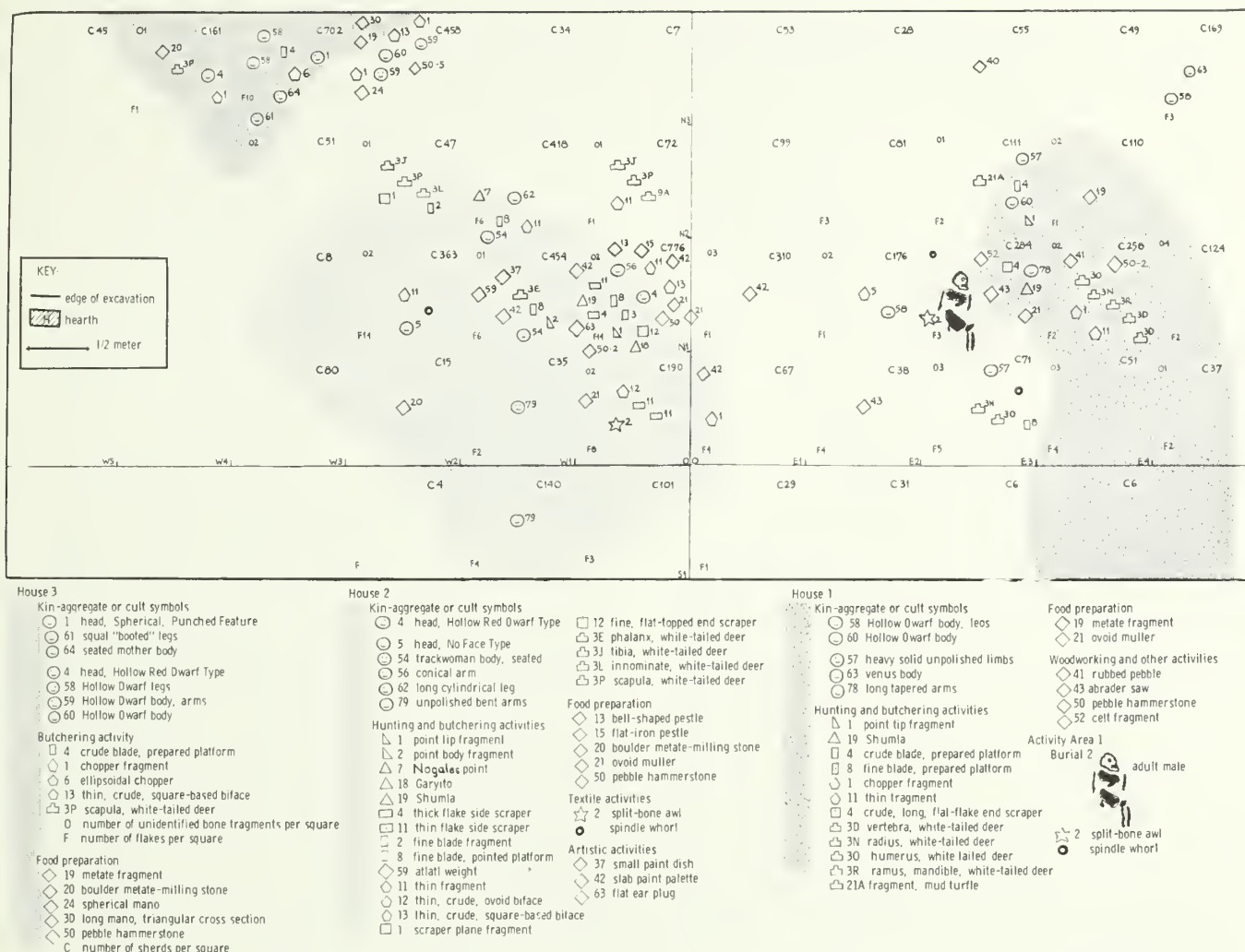


Fig. 73. The activity and house areas of Zone K² of Ts 368e with a key to their ecofacts, artifacts, and burial.

ties in House 1 are indicated by projectile points and deer bones (hunting), blades, an end-scraper, and choppers (possibly butchering and skin preparation), pottery and grinding stones (food preparation), and 2 sherd disks (string making). There were also 6 or possibly 7 figurines—2 Hollow Dwarf legs and 1 body, probably from at least 2 Hollow Dwarf figurines, and 2 solid limbs, a long tapered arm, and a Venus body from at least 1 Venus body-type figurine. Although the artifacts and ecofacts of the more clearly defined House 2, more or less in the center of our trench, seemed to show that their mundane household activities were much the same as those of House 1, the figurine types differed. There was one fragment of a head of a Hollow Red Dwarf figurine; the 7 other fragments included a No Face head, which could have

been attached to one of the 2 Seated Trackwoman bodies, a conical arm, a long cylindrical leg, and 2 Unpolished bent arms and could have come from at least 3 No Face Trackwoman body whole figurines. The final house, number 3, which may have been only partially sampled by our excavation, had fewer artifacts and ecofacts. These still indicated the same sort of household activities, but again the figurines differed. Here were a head, a body, 2 legs, and 2 arms of at least 3 different Hollow Dwarf figurines, as well as a Seated Mother body, a Squat "booted" leg, and a Spherical, Punched Feature head of at least 2 other figurines.

Thus, like the other earlier Ajalpan components with house remains, there is a high correlation between specific figurine types and specific house areas. One is

tempted to interpret these figurines as representing symbols of sodalities of the kin-aggregate groups or cults of these households.

We see, however, in these three houses a slightly different situation from the previous Ajalpan component. Although each house had one specific figurine type, i.e., No Face in House 2, Punched Feature in House 3, and Venus-body type in House 1, Hollow Dwarf figurine fragments occurred in all houses. Does this pan-house type, obviously foreign, have a significance other than that of the local figurine types which are tied closely to a single residence group? Do these Olmecoid Dwarfs represent some sort of entity or phenomenon that may have extended over a series of rather different kin-aggregate households? In the following pages we shall investigate this sort of distribution as it occurs in later levels.

Meanwhile, as we consider the more mundane activities of these groups, there is little doubt that the floor and the houses were occupied year-round. Fragments of a turtle were found that could be collected only during the wet season. Of the 3 deer (3 scapula), 1 was a young individual that would have been killed in the dry season, since deer are born in the spring or summer. All of the deer bones suggest that hunting was done primarily in the dry season, with the inference that agriculture and planting were the basic subsistence activities during the other seasons, as they were in the earlier Ajalpan components. The 2 point tips, the point body, the 2 Shumla points, and the Nogales and Garyito points suggest that the 3 deer were killed by atlatls and that the type of hunting was of the wound and trail variety.

The identifiable deer bones suggest that most of the butchering was done elsewhere and only the limbs (3 scapula, 2 humerus, 2 radius, 1 innominate, 2 tibiae, 1 astragalus, and 1 phalanx), the tenderloin (2 vertebrae and 6 proximal parts of ribs), and the tongues (1 mandible) were brought back to the 3 houses. Further, almost all the bones in this area were charred. Evidently meat was roasted over coals. The tools that may have been used for butchering or for preparing the meat for eating were in the houses—4 blades, 2 flakes, and 4 bifaces in House 2; 1 biface and 1 chopper and a blade in House 1, and a biface, 1 blade, and 4 choppers in House 3, with only 1 blade, 2 flake scrapers, 1 biface, and 2 choppers outside the house areas.

Evidence of collected wild plants and their preparation as food also came mainly from the house areas. Pestles and 3 of the 4 mullers came from House 2, a muller was found in House 1, and a scraper-plane was found in House 2.

Equally slim was evidence of agricultural activities and the preparation of this food (mainly corn). Only 2 manos, a metate, and a milling stone occurred in House 3 and a metate was in the south end of House 2. There was also the burned fragment of a humerus of a dog, indicating that they ate at least one domesticated animal.

Evidence of cooking the above-mentioned prepared food was relatively scarce. Four bones were burned and suggest roasting meat. Sherds from 3 ollas and a bowl (1 long-neck olla of Coatepec Plain, 2 short-neck ollas of Ajalpan Plain, and a hemispherical bowl of Coatepec Plain) had carbon adhering to their interiors, indicating boiling or steaming. However, the majority of the vessels seem instead to have been used for storage (33), eating dishes or decorative vessels (25). The storage vessels included 14 long-neck ollas (6 Ajalpan Coarse Red, 4 Ajalpan Coarse, 3 Ajalpan Plain, 1 Coatepec Buff), 12 short-neck ollas (5 Ajalpan Coarse Red, 2 Coatepec Buff, 2 Ajalpan Coarse, 2 Ajalpan Plain, and 1 Coatepec Plain), 4 funnel-neck ollas (Ajalpan Coarse Red), 2 beveled-lip ollas (Ajalpan Coarse Red), and 1 angle-neck olla of Coatepec Buff. Five tecomates also occurred (2 Coatepec Plain, 2 Ajalpan Plain, 1 Ajalpan Coarse). It has been suggested that they could have been used for "steaming food," but since none of our sherds showed fire blackening we suspect the ones we found were also used for storage.

Eating-bowls numbered 25. The most popular (14) were those with a convex-wall form (4 Coatepec Red-on-buff, 3 Coatepec Plain, 2 Coatepec Buff, 2 Ajalpan Plain, 1 Ajalpan Fine Red, 1 Ajalpan Coarse, 1 Ajalpan Fine Plain); but flaring-wall bowls (5) (2 Ajalpan Fine Red, 1 Coatepec Plain, 1 Coatepec Buff, and 1 Coatepec Red-on-buff), outslipping-wall bowls (1 Coatepec Plain, 1 Coatepec Buff, and 1 Ajalpan Fine Red), and incurved-rim bowls (1 Coatepec Buff, 1 Coatepec Plain, and 1 Ajalpan Plain) also occurred.

Evidence of other activities was not great; still, clustered in Houses 1, 2, and 3 were 111 flint chips, 3 crude blades, 4 flint nodules or cores, 12 hammerstones, and a battered pebble which we consider to be evidence of flint knapping. Twenty-six of the flakes had adhering striking platforms, seemingly indicating that initial flakes were usually struck from nuclei by percussion blows (13 flake platforms prepared, 2 blade platforms prepared, and 8 flakes and 1 crude blade unprepared) with only a few being removed by indirect percussion (5 pointed platforms). Most of the artifacts were finished by pressure-flaking. The fine obsidian blades indicate the opposite picture. All 4 had

pointed platforms, indicating indirect percussion, and none were retouched. However, since no obsidian flakes or cores appeared in our excavation, we surmise that they were manufactured elsewhere.

Also, probably manufactured elsewhere was the produce of the ground-stone industry, since we found no volcanic tufa fragments or partially-ground stones. These included 2 abrader saws, a celt fragment, 5 slab paint pallets, a rubbed and polished pebble, a paint disk, a spherical mano, 4 mullers, 2 milling stones, 2 metates, a long triangular cross-section mano, a bell-shaped and a flat-iron pestle, as well as an earplug and pendant.

The ground celt obviously was evidence of wood-working, but there is little to say that woodworking took place in the area excavated.

Equally difficult to correlate with any house or even with the over-all area was the evidence for skin working, i.e., the flake end-scraper and fine flat-top end-scraper.

There was, however, some evidence that one or more inhabitants of House 2 were involved in ornamentation and painting activities because we found in it 4 of the 5 paint palettes, a rubbed pebble, a paint dish, and a fragment of hematite. Also, the whistle and clay effigy animal were in this house. However, the green stone pendant and the earplug were not and we suspect that, in fact, neither of the latter were manufactured in this house. The green stone pendant and the earplug are good evidence of trading activities, as one of the sherds of Ponce Black and Tilapa Red-on-white probably came from Veracruz and the fragment of Mottled Bottle possibly came from the Valley of Mexico.

Another activity of the occupants of Zone K² was represented by the Burial (No. 2) found just west of House 1 (Square N1E3). The male adult burial had been placed extended on its back with its head north in a shallow pit and then cremated. In the burial pit was a pierced sherd disk, the other piece of a paint palette, and 2 objects we classified as split-bone awls. The so-called split-bone awl was fragmentary but showed evidence of high polish on its flat surface rather than on its edges or ends, suggesting that they were used not in a round-and-round motion for piercing but in a back-and-forth motion like weaving tools. Thus, there seems to be the distinct possibility that the awl was, in fact, a weaving tool, that the sherd disk was a spindle tool, and that the objects associated with the male burial were tools of this textile trade. It is perhaps relevant to note that in the Tehuacan area, the present-day male Papoluca are the specialists in weaving. Was this true at the time of K²?

All in all, Zone K² is little different from Zone K³, either in its types of artifacts or in its activities, and can also be classified as a Late Ajalpan component (Occupation 2), roughly in the time period from 1025 to 825 B.C.

The Way of Life of Zone K¹

Zone K¹ over Zone K² was usually dark brown in color and rather clayish. It varied considerably in thickness from as much as 40 to 50 cm. in portions of the eastern part of the excavation to only 10 to 20 cm. at W5. A comparable layer also occurred with similar artifacts in Test 1-3 of Ts 368w about 45 meters west, indicating that the zone was at least 55 meters long and at least 5 meters wide. There were two patches of ash, burned wattle-and-daub, or burned clay on its surface, one large and roughly rectangular in the west part of the excavation with corners at N.5W5, N3.1W2, N.1-0, and about S2W3. At about 3.5 west was a small hearth. This is considered to be House 1. The other patch was just the corner of a house (House 2) at N.5E3.2 with its wall running into our profile at S1E.8 and S1E5 (Fig. 74). Both were oriented roughly southeast-northwest like those of K² and may have been part of a line of houses. Zone K¹, therefore, may have been topped by a linear hamlet.

Most of the figurines occurred in House 1 and included parts from at least 3 types. The Hollow Red Dwarf was represented by only a single head fragment, but at least 3 No Face type figurines were represented by a head, 3 Seated Trackwoman bodies, a conical arm, a skinny arm, and a long cylindrical leg. Another figurine type, which may have been but a single whole figurine, was represented by a Projecting Eyc solid head, a Seated Mother body, a "booted" foot, and a large unpolished arm fragment. In the other House 2, relatively sterile of artifacts, were 2 fragments of 2 different Hollow Red Dwarf figurines represented by a small arm fragment and a large leg fragment. There is some correlation here between certain figurine types and certain houses, and we see the same sort of social implications implied by the materials from the earlier two zones. We should add, however, that there were some figurine fragments not in the houses that included a Standing Trackwoman body less than 1 meter east of House 1, 2 Hollow Dwarf bodies over 2 meters northeast of House 1, a Hollow Dwarf head over 2 meters northwest of House 1, and a Solid polished white figurine with bulbous legs 3 meters northeast of House 2. The latter white leg fragment was associated with a small clay effigy skull both

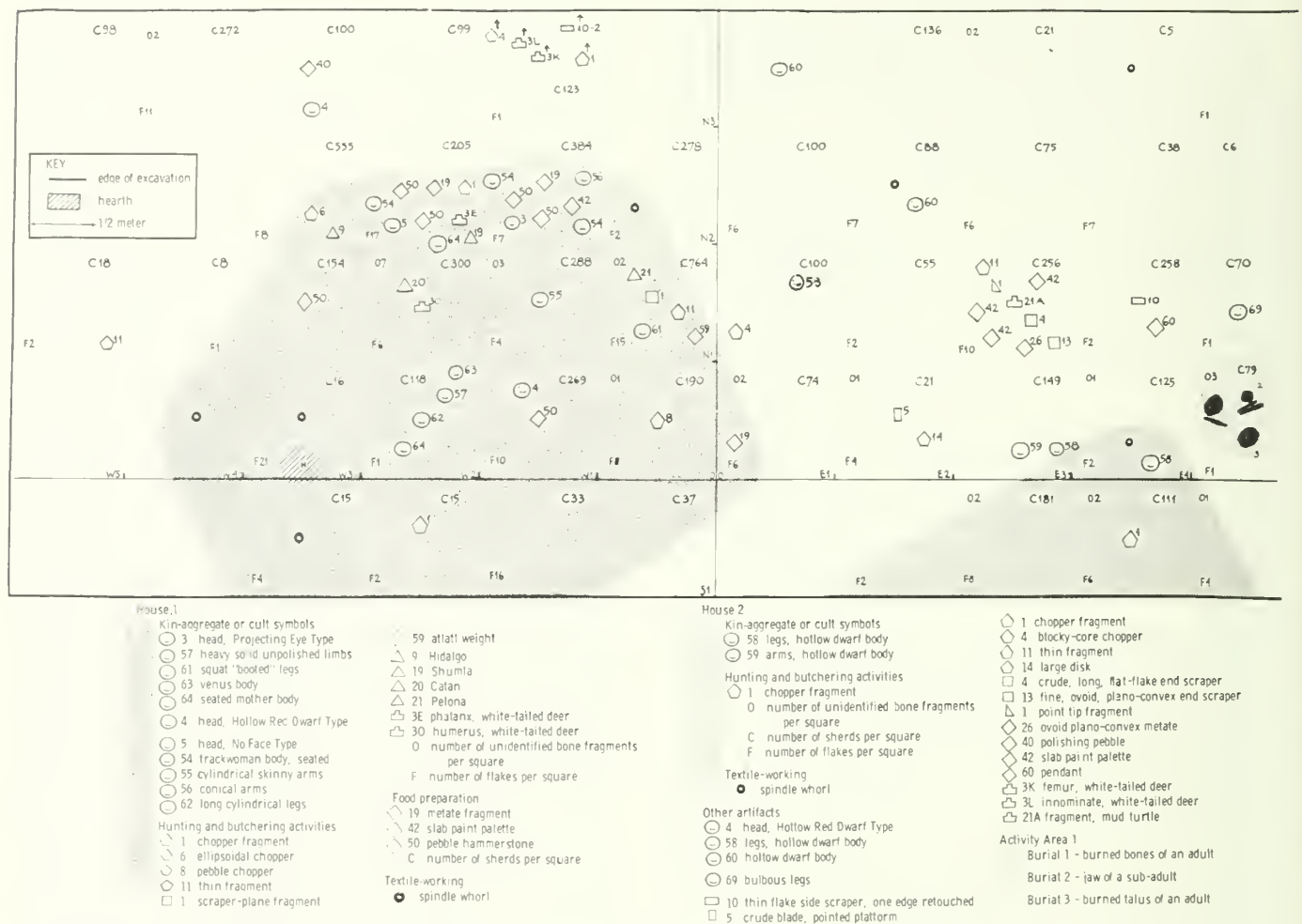


Fig. 74. The activity and house areas of Zone K¹ of Ts 368e with a key to their ecofacts, artifacts, and burials.

in the square just north of the burned remains of 2 adults and a child which in turn were associated with a Human effigy whistle fragment wearing a dunce cap. Unfortunately, our field notes say nothing of the burials or the possible associated objects other than the cursory statement in the E5 square description to the effect, "Se encontro fragmentos de un cyanco humano." Although we suspect the occupation was a permanent one, there was little evidence of this. We found only 2 fragments of turtle shell, probably collected in the summer, and 4 bones of a deer perhaps representing winter hunting. There was other evidence of hunting, as we uncovered a Pelona, a Catan, a Shumla, and a Hidalgo point, as well as a point tip and an atlatl weight. The points occurred only in House 1.

Direct evidence of agriculture was lacking; however, we did find 3 metate fragments (in House 1) and 1 ovoid plano-convex metate that were probably used to

grind corn. Two of these occurred near House 1. Evidence of plant collecting was completely lacking.

Evidence of cooking was not impressive; however, about half the bones were charred, which suggests roasting, and 10 ceramic vessels had adhering carbon (3 short-neck ollas of Coatepec Plain and 2 of Ajalpan Coarse, a convex-wall bowl of Ajalpan Plain and 2 of Coatepec Plain, and tecomates of Coatepec Plain and Ajalpan Plain).

Most of the vessels (38) were of the sort which could have been used for storage: 17 long-neck ollas (1 Ajalpan Coarse, 2 Ajalpan Plain, 1 Ajalpan Fine Red, 7 Ajalpan Coarse Red, 3 Coatepec Plain, 1 Coatepec Red-on-buff, and 2 Coatepec Buff), 11 short-neck ollas (1 Ajalpan Coarse, 2 Ajalpan Plain, 1 Ajalpan Coarse Red, 3 Coatepec Plain, 1 Coatepec Red-on-buff, and 3 Coatepec Buff), 4 funnel-neck ollas (3 Ajalpan Coarse Red, 1 Coatepec Plain), 2 beveled-lip

ollas (Ajaltan Coarse Red), 3 tecomates (2 Coatepec Buff and 1 Coatepec Red-on-buff), and a single bottle of Coatepec Buff. Dishes that also appeared were predominantly convex-wall bowls (4 Coatepec Buff, 3 Coatepec Red-on-buff, 2 Coatepec Plain, and 1 Ajaltan Coarse Red), but flaring-wall bowls (1 Ajaltan Coarse Red and 1 Coatepec Plain), outslipping-wall bowls (2 Coatepec Plain and 1 Ajaltan Coarse Red), and an incurved-rim bowl (Coatepec Plain) were also present.

There was some evidence of flint knapping during this time period, but little to say that it was done in any specific area. All 6 hammers were in House 1, but only 100 of the chips were in this area and the rest randomly distributed outside. Twelve of the 17 flakes with striking platforms had prepared platforms; 3 were unprepared indicating most initial flakes were removed by percussion, perhaps by the 8 so-called choppers. Two flakes and a crude blade had pointed platforms perhaps indicating some use of the indirect percussion technique. The complete artifacts, 3 side-scrapers, 3 biface scrapers, the bifacial disk, 4 end-scrapers, 1 gouge, and 5 points showed evidence of pressure-retouching to finish them after they had been originally percussion-flaked.

Another activity undertaken by the inhabitants of Zone K¹ seems to have been hide preparation, as evidenced by a bone awl, 2 crude long flake end-scrapers, 1 fine ovoid end-scrafer, and a crude discoidal end-scrafer. All these implements occurred in 2 squares east of House 1 and north of House 2, which may still be considered an activity area.

Again, there must have been woodworking activities, but the only evidence was a single flint gouge. Also, in the corners of House 1 were 4 sherd disks indicating (cotton?) yarn-making on a spindle whorl. Slab paint pallets and a polishing pebble plane, a piece of jade, and a jade pendant hint at ornamentation activities. The jade, however, may have been imported. Eight fragments of Mottled Bottle were traded from the Valley of Mexico.

The percentages of sherd types as well as the other artifacts certainly indicate Zone K¹ was a Late Ajaltan component. Three specimens of charcoal from House 2 gave dates of 690 ± 120 B.C. (I-916), 745 ± 120 B.C. (I-914), and 690 ± 130 B.C. (I-908), averaging 708 ± 71 B.C. (*Radiocarbon* 11:99, 100). Comparative data indicates that the deposit was laid down in the ninth or tenth century B.C. (Occupation 3).

The Way of Life of Zone J

Zone J overlaying K¹ was described as light brown in color and 20 to 50 cm. thick, averaging about 30 cm.

A similar strata at about the same depth also occurred 45 meters to the west in Test 1, so we believe Zone J was quite extensive and represented the refuse from a hamlet. A study of the profiles revealed a dumbbell-shaped area running from about N4E4 to E1 capped by ash and, in the south, by slabs of stone (House 2, Fig. 75). The notes mention wattle-and-daub occurring in 3 squares and in another square a piece of painted "stucco." In this area, near the surface of Zone J, House 2 was a major concentration of artifacts which included a leg fragment of a large Hollow White figurine and a head and a body fragment of a Hollow Red Dwarf figurine. This seems to have been a roughly rectangular-shaped (3 by 5 meters) wattle-and-daub house with a slab stone foundation in which lived a kin-aggregate group with two distinctive figurine types.

The other house area, No. 1, was not as well defined. Burned floor showed only from W2 to W5 in the N4 profile and ash particles appeared in areas from N4W3 to N3W3, from N4W4 to N2.5W4, and from N4W5 to N3.5W5. These squares had a fair concentration of artifacts, but so did a number of squares just south of the burned floor area; namely, Squares N2W2, N2W3, N1W1, N1W2, W1, and W2. Whether this latter area was within the house represented by the burned floor to the north and, for some unknown reason, left no visible feature of the southern part of the house, or whether it was an area of refuse from the inhabitants of House 1 could not be determined. Regardless of the extent of House 1, it still represents the material remains or living area of another group, and the figurines in the northern burned floor area seemed to belong to a specific kin-aggregate. They included 2 head fragments and a leg fragment of at least 2 Hollow Dwarf figurines as well as 2 No Face figurine heads, 2 long tapered arms and two hands on legs, a bent arm, a Heavy solid unpolished limb, and the body of a Seated Trackwoman which was smaller than any of the heads, suggesting that these 4 figurines were associated with this area.

It must also be added that a fragment of a No Face Dwarf was found in the area between the 2 houses. Again, the distribution of the figurines have definite social structure implications. Is it not possible that the Hollow Red Dwarf figurines occurring in both houses represented a pan-household phenomenon such as a cult, while the No Face and solid unpolished figurines of House 1 and the Hollow White figurine of House 2 each represent symbols of kin-aggregates? If so, is it not possible that integrative factors of this Late Ajaltan society were of both a religious and a kinship nature?

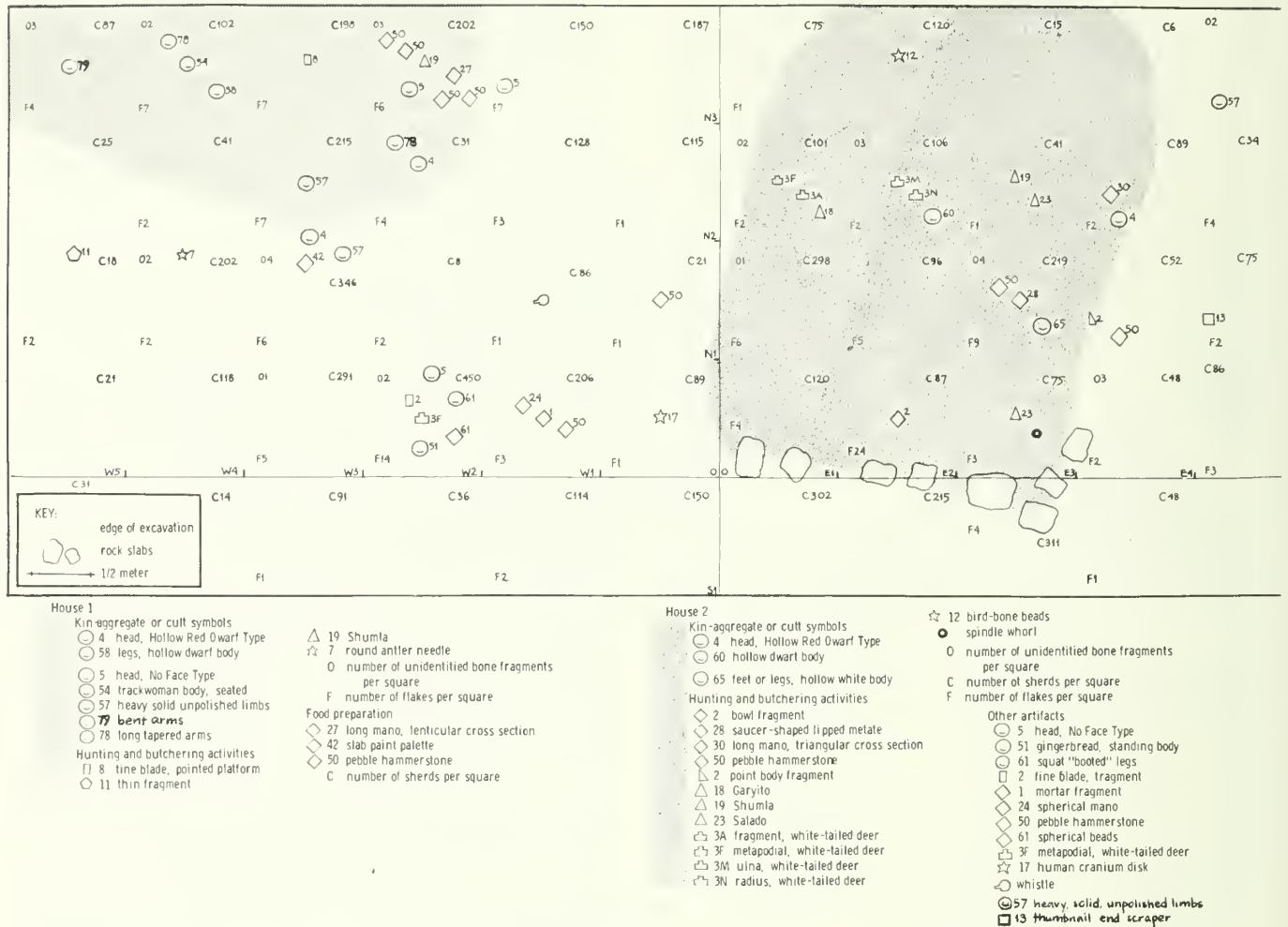


Fig. 75. The activity and house areas of Zone J of Ts 368e with a key to their artifacts and ecofacts.

Turning to the more mundane activities of the inhabitants of the houses, we see some evidence of hunting and butchering. Projectile points and bone fragments occur in both houses, as well as a blade and a biface in House 1. Although we would guess that the hamlet was occupied on a year-round basis, there is no evidence of hunting taking place mainly in the winter as in other Ajalpan floors. The many grinding stones, both in the houses as well as outside, seem to indicate that seed grinding was a major method of preparing food and, inferentially, that corn agriculture was the major subsistence activity. Again, sherds were everywhere. Ollas and bowls predominated, but we have no evidence of whether they were used for cooking or merely for storage and eating.

Both houses had hammerstones and chips suggesting flint knapping; tools hint at bone-working activities;

and a needle in House 1 and a spindle whorl in House 2 suggest some concern with textiles.

Generally speaking, artifacts were not numerous nor were concentrations well defined, so our reconstruction of the way of life of Occupation 4 is not very convincing. The numerous sherds as well as other artifacts allow it to be classified as a Late Ajalpan component, perhaps in the period roughly from 950 to 750 B.C., for there are Carbon-14 dates averaging 803 ± 89 B.C. (I-931, I-915) (*Radiocarbon* 11:100, 101).

The Way of Life of Zone I

This zone was noticeably thicker (about 40 cm.) along the east wall of our excavation than to the west where it was only about 10 cm. thick. In the profile drawing it is described as yellow-brown, and in its western end as having "stippling," meaning sand, and

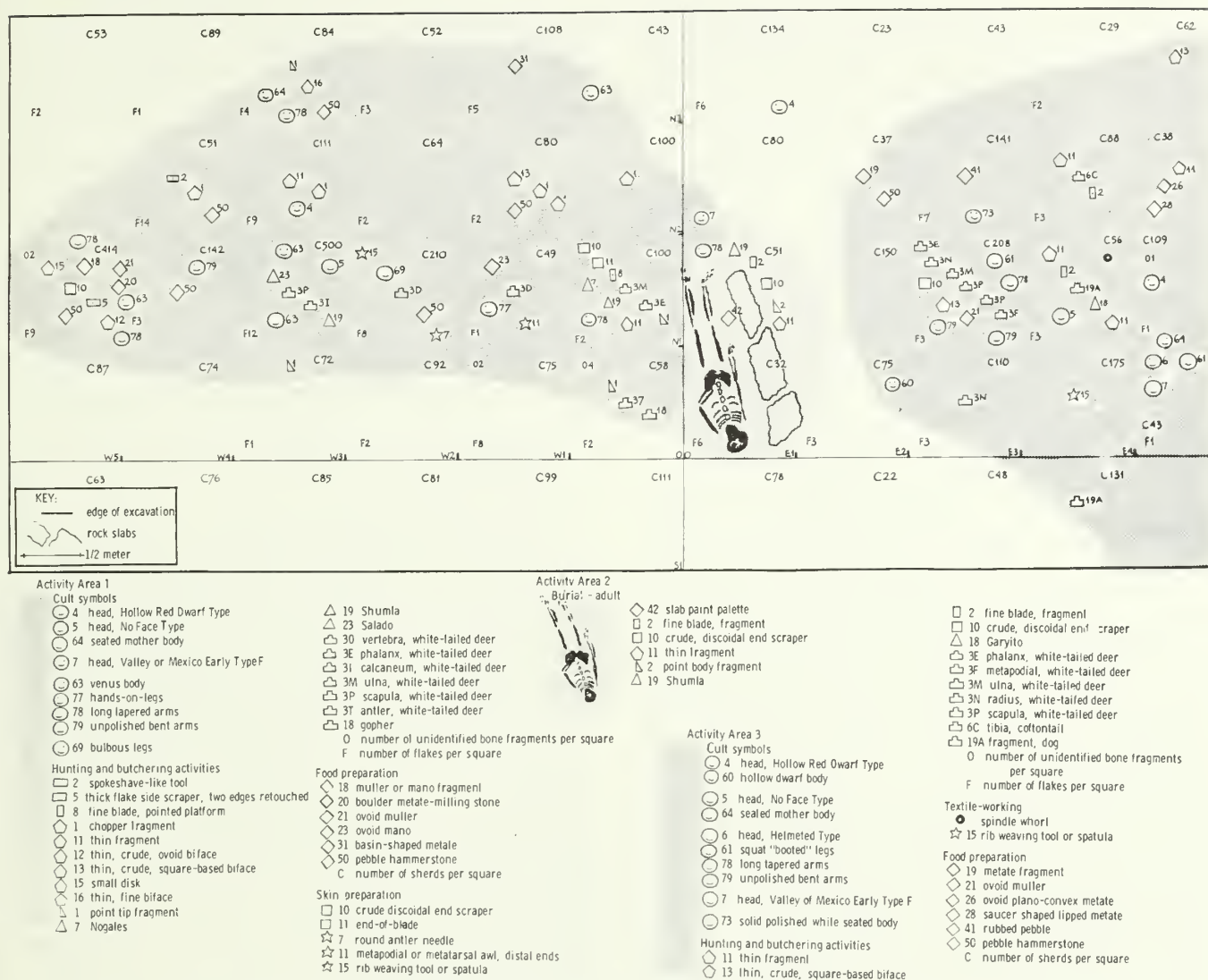


Fig. 76. The activity and house areas of Zone I of Ts 368e with a key to their ecofacts, artifacts, and burial.

small circles signifying gravel. In the drawing of the northeast corner of our excavation, the word "ash" is written, but no floor was recorded. This then is the only justification for considering it an occupational zone. However, plotting the artifacts and ecofacts revealed two concentrations, one roughly east of the E2 axis and the other west of a burial in Squares E1 and N1E1 roughly between the 0 and the N2 axes (Fig. 76). Since there were no floors, no house features, nor even any mention of wattle-and-daub, we have referred to these as activity areas, although they could very well have been the refuse from specific houses.

The figurine types in these two areas are now quite similar rather than being of different types. In the

west, Activity Area 1, there were fragments of Hollow Red Dwarf, Early Type F, Seated Mother, and No Face as there were in Activity Area 3. Only the Venus type body fragments in Activity Area 1 and the Helmeted type in Activity Area 3 were unique to these areas. This first Santa Maria floor is rather different from the previously described Ajalpan ones, not only in the figurine distribution, but also in having more types per concentration. Some had obvious foreign or wider affiliations—the Helmeted and Solid Polished White figurines are like those of the Gulf Coast and the Early Type F, which comes from the Valley of Mexico. We believe this has important social implications.

While it is, of course, possible that the many figurine types in common in the two areas could mean a kin-aggregate household group occupying two different houses next to each other, it does not explain the Helmeted types only in Area 3 and Venus bodies only in Area 1. We believe that perhaps a better explanation of this distribution is that these latter distinctive figurines are the kin-aggregate symbols of two different groups and that the many types in common are symbols of sorts of cults or other phenomena that extend over all households and are some sort of cohesive force holding that society together. In other words, between Ajalpan and Santa Maria there was a subtle shift from a society united on the basis of family and/or kinship relationships to one held together by some sort of religious phenomena separate from and above the more basic kin-aggregate units. As we shall see, this sort of figurine distributional pattern with its social implications occurs in most Santa Maria hamlet or village components.

Other evidence of ceremonialism lay in the extended burial in Squares E1 and N1E1. Because it was badly disintegrated, this burial was not reported on in Volume 1. The rather poorly-done field sketch of it suggests an adult lying on its back in some sort of shallow pit lined with three large slabs on its east side. The "bone dust" of the skeleton was not burned, and the meager drawing suggests it was a primary burial dug into the village area. Although the half-completed burial sheet makes no mention of burial goods, the 2 squares were loaded with such artifacts as a Shumla point, a fine blade, an end-scraper, a biface, a paint palette, and much pottery. We suspect that some of these, if not all, were grave goods. If so, the individual was well furnished with hunting and butchering equipment for the hereafter.

As we turn to the more mundane activities of Zone I, we see they are not radically different from the earlier components. Bones of 3 deer and Nogales, Garyito, Shumla, and Salado points indicate hunting by both groups. The choppers, fine blades, and many bifacial knives may be evidence of some local butchering. End-scrappers, awls, and needles, mainly in Area 1, suggest skin-working. The rib spatula and spindle whorl in Area 2 may represent some sort of textile activity. Also, both areas had many grinding tools suggestive of food preparation of seeds including agricultural produce. There were also in the west area a fair number of chips and hammerstones indicating flint knapping.

Pottery, although concentrated in the activity areas, was everywhere in the zone and was very different

from the pottery of the underlying strata. New types such as Canoas Orange and White, Coatepec White, Coatepec White-rimmed Black ware, Rio Salado Gray and Coarse, and Quachilco Mica occurred. There were a number of trade sherds from the Valley of Mexico, the Mexican Gulf Coast, and even the Guatemalan Gulf Coast. Not only was the pottery made and decorated by new techniques, but the vessel forms were mainly those of ollas and flat-bottomed bowls or dishes—the old tecomates for steaming food were on the way out. This pottery is an excellent basis for classifying Zone I as an Early Santa Maria component, probably in the time period from 850 to 750 B.C. Four very consistent radiocarbon determinations averaging 766 ± 68 B.C. (*Radiocarbon* 11:98, 99, 100, 101) confirm such an estimate for Occupation 5.

The Way of Life of Zone H

Zone H, although slightly lighter in color, was much like Zone I, rather sandy, and without well-defined floors except for a few flat slabs lying on its surface in N1W1. These few rocks are the only basis for our considering it an occupational layer. Plotting artifacts and ecofacts, often badly eroded, revealed no significant concentrations. In fact, we believe this stratum was mainly a colluvium of clay, sand, and refuse spread over the top of Zone I, and the many badly-worn sherds tend to substantiate such a view. Because of this manner of deposition, it is difficult to reconstruct the way of life of the people of this period, except in the broadest terms.

Bones of a deer, raccoon, and cottontail with Catan, San Nicolas, and Salado points suggest hunting; fine and crude blades and bifacial knife fragments, butchering; and the many manos, metates, and stone bowls indicate food preparation, possibly some seed collecting and agriculture. The end-of-blade and thin side-scrappers as well as the scraper-planes could have been used on hides, the gouge on wood, and the hammers in making chipped stone tools. Pottery was much like that of the previous horizon, and the figurines, although not numerous, also showed considerable variations. The materials indicate Occupation 6 was also of Early Santa Maria times, roughly from 825 to 725 B.C. Three radiocarbon determinations gave an average of 842 ± 75 B.C. (*Radiocarbon* 11:99), but two of them could well have included some carbon washed in from earlier horizons.

Zone G

Zone G, whose clayish soil was full of sand and small pebbles, was also washed or flowed onto the site from

the east. It varied between 10 and 30 cm. in thickness and was without cultural features or significant clusters of artifacts or ecofacts. It was not considered an actual occupational zone, and even less can be said about the way of life of this period.

Again, the bones of deer, peccary, cottontail, and dog in association with a Garyito point suggest hunting, and the many choppers—pebble, disk, flake, blocky-core, and large disk—as well as bifaces and blades and side-scrapers suggest local butchering. A bell-shaped pestle, an ovoid muller, and an ovoid plano-convex metate were the only evidence of seed preparation, possibly of domesticated foods, and the scraper-planes, crude ovoid end-scrapers, end-of-blade and thin flake end-scrapers, in conjunction with a bone awl, may be taken as evidence of skin working. Pottery was much like that in the previous two strata, and a few fragments of figurines of the Baby Face and Hollow Lowland types occurred. These, like the Rocker-stamped sherds, White slip-red paste sherds, and Kaolin Fine White and Hard Buff sherds were obviously imports from the Olmec Gulf Coast area. The percentage of sherd types suggests this stratum was laid down in the eighth century before Christ and, as one might expect from a washed-in zone, the two radiocarbon determinations do not agree with such an estimate.

The Way of Life of Zone F

This was an extremely thick (.80 to 1.20 meters) reddish-brown clayish stratum that capped Zone G. It obviously represented, in part, alluvial soils that had washed onto the sites, as it had pebble and sand patches in it as well as dumped refuse. Sherds and chips were prevalent from top to bottom and slabs of rock and adobe block that occurred at various levels in the stratum indicated that there were probably a series of occupations within it. Most of our artifacts came from the top 20 cm. level and in the east end the zone was capped by ash and charcoal. Slabs which were probably parts of house walls occurred between N1W5 and N1W6. This we consider was a single hamlet occupation, and by plotting the artifacts, ecofacts, wattle-and-daub, and painted plaster, two concentrations correlated roughly with the east and west house features. The western one we have called House 1 and the other, extending out from the northeast end, we have designated as House 2 (Fig. 77).

There were many figurine fragments (42) from both houses, with at least 6 or 7 distinct types in each. Common to both were figurines of Hollow Dwarf, Crescentic Cap, Hollow Lowland, and Solid Polished White

figurines. A Trapiche Banded Helmet, a Ploughed Eye large solid type, and a Type Di were confined to House 1, while a Helmeted type occurred in House 2. All of these figurine types which occurred in both households were also found in many contemporary sites in Veracruz, Puebla, Oaxaca, Tabasco, and Chiapas. By this time figurines were not just the symbols of some sorts of kin-aggregate groups as they had been in Ajalpan times, but rather were symbolic of some sort of a widespread social or religious phenomenon such as a cult or related religion. One might speculate that the earlier Ajalpan figurine types which were usually confined to specific houses of kin-aggregate groups and which had few widespread affiliations had by now evolved into something rather different. Probably originally the ceremonial life of the kin-aggregate groups was under the aegis of a part-time or full-time specialist of a specific kin-aggregate group, a lineage priest, or a shaman who undertook specific rituals or ceremonies for the group. Probably certain figurine types were connected with them. One might guess that, as some of the leaders of these kin-aggregate cults and their ceremonies became successful or popular, a number of them spread and were utilized by other kin-aggregates, first within their hamlets and then over a relatively larger area. These cults, by the time of Zone F, would have been under the authority of full-time specialists whose basic loyalties were now stronger to the cult group than to the specific kin-aggregate, the village, or the cultural group. Thus, the members of each house in each hamlet, such as those of Zone F of Ts 368e, would belong to a number of cults and would have the symbols of those cults in their houses. Now we have the beginnings of a pantheon of gods and a calendar-round of cult ceremonies with priests as leaders of these societies operating on a level above that of kinship relationships. At this time the pantheon would have been ill-defined and the cults relatively independent. By Palo Blanco times the pantheon would have been a single well-defined unit of a single ruling religion, for it is then that we begin to see the incense burners and mold-made figurines of certain gods that existed at the time of the Spanish Conquest. Having speculated on their spiritual life we shall examine briefly the artifacts and ecofacts which can be tied more securely to their specific activities.

The bones of 2 deer and 2 rabbits with Almagre and Catan points in both houses suggest that some members were involved in hunting. Bones of a dog in House 2 indicated that their meat diet was supplemented by food from a domesticated animal. Blades, side-scrapers, bifaces, and choppers in both houses indicate some

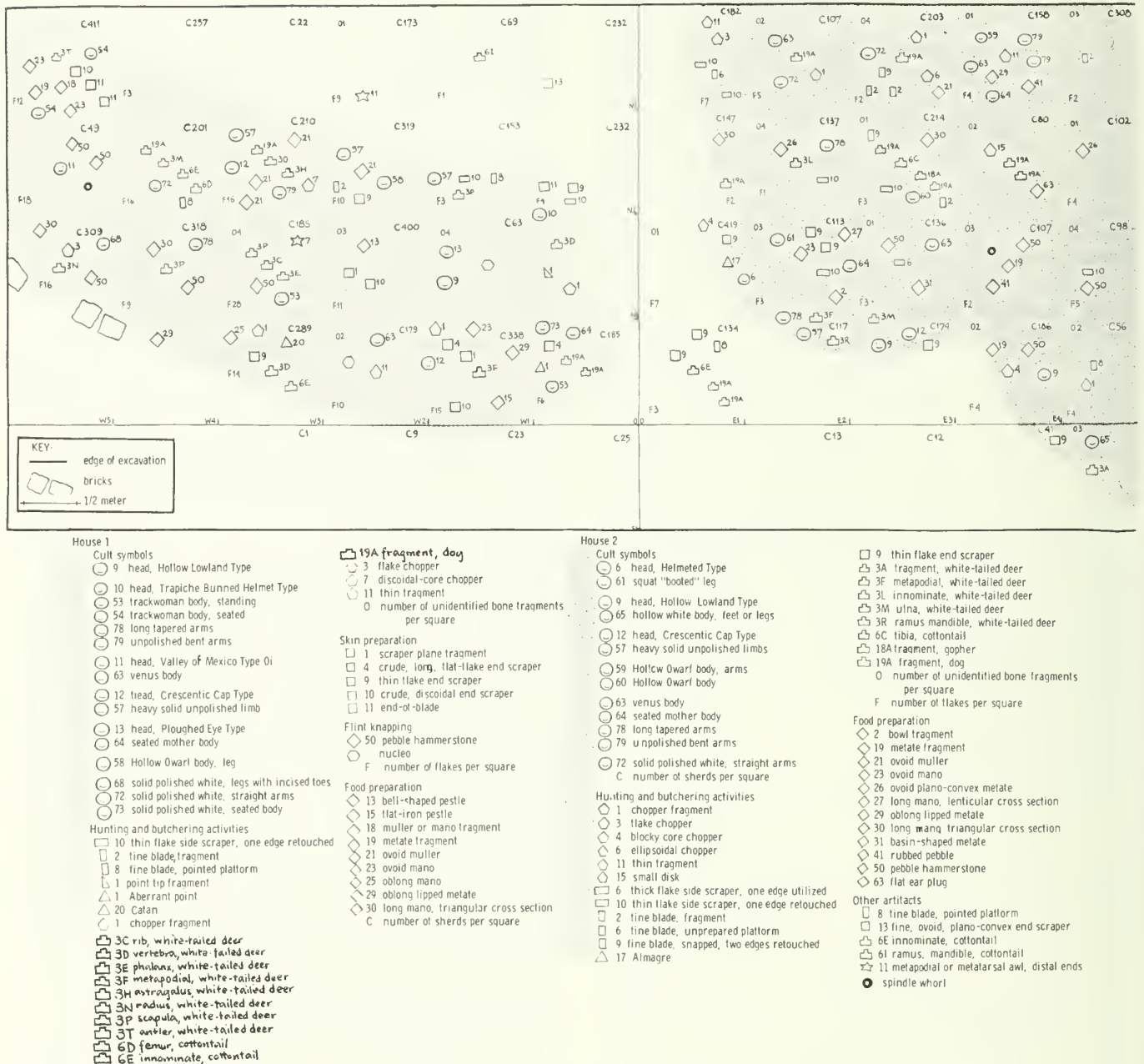


Fig. 77. The activity and house areas of Zone F of Ts 368e with a key to their ecofacts and artifacts.

butchering. Charred bone suggests roasted meat. One end-scraper was found in House 2; many more end-scrapers and a bone awl in House 1 indicated skin-working. Flakes, cores, and choppers which could have been cores, in association with many hammerstones, suggest that many of these tools were made by members of each of the households. Grinding stone in both houses indicated seed preparation. There were also

many ceramic vessels for cooking and storage. Again, there were many trade sherds from the lowlands and the Valley of Mexico. Many of the figurines also may have been imported. The sherds indicate that Zone F represented one or more components of Early Santa Maria, roughly from 775 to 675 B.C. Two radiocarbon determinations averaged 775 ± 92 B.C. (*Radiocarbon* 11:100).

The Way of Life of Zone E

Zone E was a light brown clayish soil between 20 and 50 cm. thick. Much of it seemed to be colluvium and refuse which had spread over Zone F. There may have been a hearth in Square N1 where the zone was capped by charcoal, indicating that it was occupied; however, plotting the artifacts and ecofacts revealed no clustering; still, most of the artifacts were in the west half of the excavation.

It is hard to give a very full picture of their way of life. What evidence we do have suggests it was repetitiously like the other Santa Maria components described.

Briefly, bones of a deer, a peccary, 2 rabbits, and a raccoon with Catan, Garyito, and Salado points suggest hunting. We also found the bones of a dog. Many fine blades, side-scrapers, bifaces, and choppers suggest butchering, and 2 pestles, a stone bowl, an ovoid muller, ovoid and long manos, and ovoid and basin-shaped metates may indicate seed preparation and agriculture. Gravers, ovoid, flat-topped, thin flake, and long flake end-scrapers may show they prepared skins and a gouge may mean woodworking. An anvil stone, hammers, cores, and flakes indicate flint knapping, and a sherd disk, textile making. Further, a paint pallet, jade earplugs, and polishing pebbles, as well as Crescentic Cap, Di, Helmeted, Hollow Dwarf, and Solid Polished White figurines all hint at aspects of their ceremonial activities.

As always, there were many sherds, which not only suggest further food preparation activities, but also allow us to classify the zone as being of Early Santa Maria times, 750 to 650 B.C. Three radiocarbon determinations, averaging 765 ± 77 B.C. (*Radiocarbon* 11:99, 100, 101) tend to confirm this estimate of Occupation 8.

The Way of Life of Zone D

Zone D was much like Zone E in thickness and extent and in having only one small patch of burned floor, this time in Squares N2 and N3, as well as in having no concentrations of artifacts. However, it was slightly different in color, a reddish-brown rather than light brown. This ninth occupational layer had fewer non-ceramic artifacts than many of the previous ones and so it was even more difficult to make interpretations of the way of life of this period.

The evidence of hunting was in the bones of 2 deer, 2 rabbits, and a gopher and 4 broken point tips. As in the other Santa Maria components from about Zone I times on, there seems to have been a subtle shift away

from the relatively uniform pattern of Ajalpan. Not only were there fewer bones of hunted animals per floor and fewer projectile points, but there was little if any evidence of the Ajalpan pattern of winter hunting. What does this mean? First of all, it seems possible that with the rapidly increasing human populations of Santa Maria times, particularly in the humid river bottoms (the winter habitat of deer) the deer population was being eliminated. Another more basic change may have been taking place as well—multi-season irrigation agriculture which was becoming a prevalent subsistence activity. As our evidence from Purron Cave showed, this is the period when it began. This may have meant that planting crops in irrigated fields in the dry winter season not only allowed less time for hunting, but there also may have been not as great a need to supplement their stored wet-season crop with meat from hunting and trapping. Further, there was a slight increase in the use of domesticated dogs which could have helped satisfy a “natural craving” for meat on the table.

Thus, agriculture and the use of seed foods was an important factor at this time. The muller-mano and metate fragments, the ovoid muller, the long manos lenticular in cross-section, and the oblong-lipped metate and hammerstones or pebble pestles would tend to substantiate this conclusion. In fact, one cannot help but wonder if the fine blade, flake side-scraper, bifaces, disk chopper, and even thin flake and long crude flake end-scrapers, graver, and scraper-plane were not utilized in preparation of food instead of or as well as in butchering and skin preparation. Much food, of course, could have been cooked and stored in or eaten from the many vessels represented by the sherds we uncovered. One of these sherds, however, a comal fragment, is evidence that a new food and a new cooking technique were now in use. Its burned bottom and many similarities to modern comales suggest that tortillas were being grilled. So now the cuisine of ancient Tehuacan had attained a truly fine and distinctive flavor.

Besides these locally-made sherds there were about 30 that seemed to have been imported from Oaxaca, the Valley of Mexico, Chiapas, and the Olmec Gulf Coast domain. The figurines including a Di head, the Solid Polished White body, Venus body and limb fragments, the Hollow White body fragment, and the Ploughed Eye head attached to Seated Mother bodies with unpainted limbs also have definite affiliation with the Olmec realm, though slab paint palettes and rubbed and polishing pebbles show that some artistic endeavors were undertaken locally. However, regard-

less of where the latter were made, there is good evidence of widespread contacts and trade.

Cross-dating from these trade materials and analysis of our local ceramic trends with two radiocarbon determinations averaging 718 ± 99 B.C. (*Radiocarbon* 11:99) allow us to estimate that Zone D was deposited in the period from 725 to 625 B.C. and was an Early Santa Maria component (Occupation 9).

Zone C²

After the occupation of Zone D, sand, gravel, and yellow brown clay with refuse was deposited by water action over the western two-thirds of it. This colluvium was designated Zone C². Ordinarily, this earliest subzone would have been designated as C in keeping with our usual custom of numbering new subdivisions of zones from early to late; however, this upside-down enumeration was in keeping with the unusual system of records and field notes at Ts 368e—that is, a system often designed to confuse rather than enlighten. There were few artifacts in Zone C², not very many sherds, and no figurine fragments, so there is little we can say about the way of life of these people other than to guess that it was probably much like that of the previous horizon. Furthermore, there were no projectile points or deer bone. Sherds reveal it to be an Early Santa Maria layer deposited roughly between 675 and 575 B.C. A single radiocarbon determination (I-933) of 635 ± 130 B.C. tends to confirm our estimate (*Radiocarbon* 11:101).

The Way of Life of Zone C¹

Zone C¹ overlay all of C² and, to the east, Zone D. This zone varied from 30 to 60 cm. east to west. In the northwest section of the trench adobe blocks and rectangular slabs of rock with wattle-and-daub suggested some sort of a structure. Although sherds and chips occurred in most squares, other artifacts and all the bones and figurines occurred between the N2 and N4 axes from W3 to W4.

A few bones of a deer, a rabbit, and a dog occurred with no projectile points, indicating a further de-emphasis on hunting. There were more mullers, manos, and metates. Again, we would suspect that some bifaces, blades, and end-scrapers were connected with food preparation, but the many choppers, cores, flakes, and hammerstone make one suspect that flint knapping in this house was a major activity. A celt fragment, an abrader saw, and 3 perforated sherd disks attest to woodworking and textile making. Figurines were not numerous, and seemed to belong to a Baby Face type, a Negroid with Hairknot type, a Medallion-bodied

type, and perhaps a Seated Mother type. A burned adult skeleton also occurred in the refuse near a jade earplug, indicating further ceremonial interests.

Sherds were quite numerous and indicate that clay vessels were used for cooking, storage, eating plates, and so forth. They also indicate that this is one of the final components in Early Santa Maria. An averaged date of 608 ± 92 B.C. (*Radiocarbon* 11:98, 99) agrees with this estimate for Occupation 10.

The Way of Life of Zone C and Zone E

Zone C of Ts 368e was a reddish-brown burned layer, heavily impregnated with charcoal, and was about 10 to 20 cm. thick extending over our eastern excavation. A very similar zone, called Zone E, with about the same percentages of sherd types, occurred in the western Ts 368w excavation underlying the pyramid. It was, in fact, the layer on which the pyramid was built. We believe that our site had now grown from a hamlet into a village. Our field notes on the pyramid are at best meager, so there is little we can say about its construction or dimensions. A study of the photographs suggests that earth was first piled up for the core of the pyramid and then a layer of rocks about 10 cm. high and 60 cm. wide outlined the base of the pyramid. Next, a second layer composed of two piles of rock about 20 cm. thick was placed on top of the first layer. This second layer was flush against the earth fill but was only about 40 cm. wide and so formed a step about 20 cm. back from the first layer. A sloping wall of rock was then set on the step along the back of the second layer 20 cm. back from its edge, thereby completing the outer wall of the truncated pyramid to a height of about 1 meter. The final step was covering the walls with a thin layer of clay and building a set of steps about 3 meters wide, 10 cm. high, and 20 cm. deep along a central portion of the wall. Although the notes are not clear, it would appear that the corner of the pyramid occurred in the 2-by-2 square called Test 4 and was about 40 meters from the southeast corner. Although our trench extended beyond the step, the southwest corner was not located nor was any attempt made to find the northeast corner, or northwest corner. A few well-selected tests, instead of the 33 tests we have, might have solved this simple geometric problem, but by this time the plans of the Director of the Tehuacan Project seem to have been subverted.

Be that as it may, we did clean off the front of a truncated pyramid and found a few sherds in Zone E, the layer on which the pyramid was built. Generally speaking, however, this sacred area was kept clean,

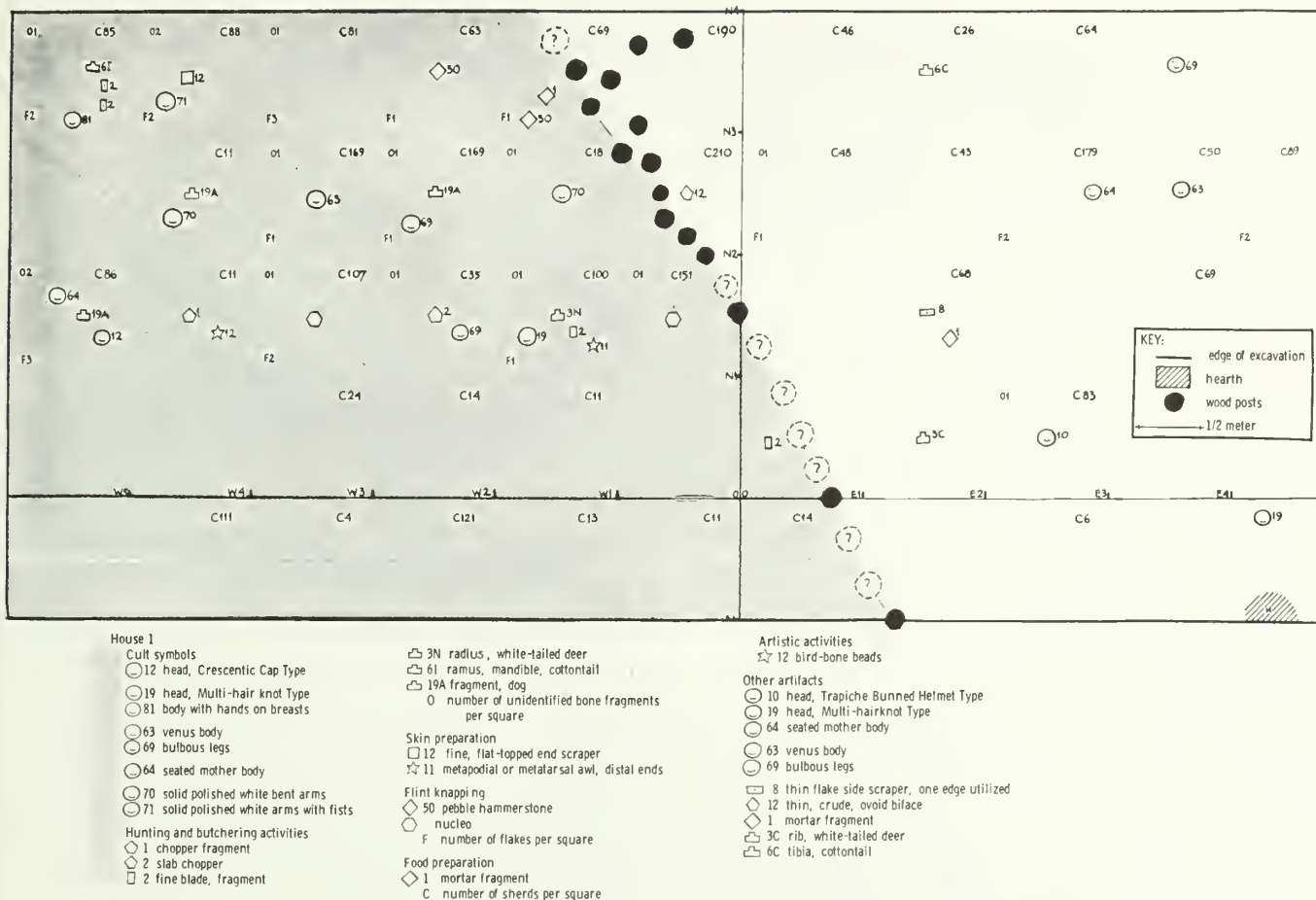


Fig. 78. The activity and house areas of Zone C-1 of Ts 368e with a key to their ecofacts, artifacts, and features.

and most of the artifacts and ecofacts came from the village layer to the east. There they revealed that the way of life of the villagers was pretty much unchanged in spite of the proximity of the pyramid with all its implications concerning full-time specialists in the ceremonial realm.

There were not many artifacts or ecofacts, potsherds excepted, in the village area, and almost all of them came from the northeast quadrant of our trench from 0, to N3W1 to N3E2 to E5 to 0—probably a house area. There is more evidence that hunting was on the wane; we found only 4 bones of a rabbit, 2 dog bones, 2 bird bones, and a Garyito point and tip. Grinding stones were still numerous, and there were about 16 fine blades, a crude blade, 5 scrapers, and 3 choppers, all of which had been used in food preparation. There was also a graver, 2 end-of-blade scrapers, and 3 thin flake scrapers, possibly for skin working, a spokeshave for woodworking, and a polished pebble, 2 rubbed pebbles, and a slab paint pallet, as well as a

labret and earplug, all of which may have been connected with artistic endeavors. Again, this small house layer was loaded with many figurine fragments of a larger variety of types: Hollow Dwarf, Baby Face, Di, Crescentic Cap, Big Nose, Negroid Hairknot, Multi-hairknot, High Turban Slit Eyes, and perhaps others. It would seem that the members of this household belonged to a number of cults and had symbols of practically a pantheon of gods in their house.

As usual, the house area, as well as much of the rest of the zone excavated, was full of sherds that showed that not only were clay receptacles utilized, but also that this zone is a Late Santa Maria component, in the period from 550 to 400 B.C. (Occupation 11).

The Way of Life of Zone C-1 and Zone D

Zone C-1 in Ts 368e was a yellow-brown soil 30 to 50 cm. thick and, on the basis of pottery-type percentages, seems connected with Zone D of Ts 368w that overlapped the bottom step of the pyramid. We were

so sure of this correlation that in the Volumes 2 and 3 tables we lumped materials from both under the columns marked Zone D of Ts 368w.

The village, which was quite large, not only had a pyramid in its west end, but also had an excavation in the east trench which revealed a line of post holes (Fig. 78). These were actually mentioned in the deficient field notes, but neither their dimensions nor their locations were given. Photographs were taken of the post holes in Squares N1 and N2 but no mapping of them was undertaken (or if it was, it never got back to headquarters). Our reconstruction of them, then, is based only upon the photographs and three profile drawings, so it is relatively inaccurate and does not allow us to say what sort of a structure we are dealing with—that is, a palisade, a large house, or just what. We have concluded, on the basis of burned flooring, wattle-and-daub, and the concentration of artifacts to the west of the posts, that we uncovered the northeast wall of some sort of large house.

Artifacts and ecofacts associated with this possible large house were not numerous; most of our figurines (11) occurred to the west of the post holes which we assume means they were in the house. As with other houses of this time period, they belonged to a wide variety of types (probably 7 specimens): Crescentic Cap (1 specimen), Trapiche Banded Helmet (2 specimens), Multi-hairknot (1 specimen), and Solid Polished White (3 specimens). Five fragments were east of the post, supposedly out of the house.

Most of the other artifacts representing more mundane activities appeared to be within the house. These included deer, rabbit, and dog bones, indicating a little hunting, trapping, and use of domesticated animals, as well as a muller-mano indicating seed grinding and perhaps agricultural activities. There also were fine blades, a biface, and choppers which could have been used in food preparation, as well as a fine flat-topped end-scraper and awl for skin working. A hammerstone, 2 cores, and flakes may indicate some flint knapping.

Again the preponderate artifacts were sherds and these allowed us to estimate that this zone or these zones were a Late Santa Maria component in the general time period from 400 to 250 B.C. (Occupation 12).

The Way of Life of Zone B and Zone C

Capping Zone C-1 to the east was a light brown layer of soil, Zone B of Ts 368e, which seemed connected with the dark brown stratum of Zone C of Ts 368w. It not only covered Zone D in that area but also covered all but the top of the pyramid. We would guess that this was just a dumping deposit and that the

pyramid probably was no longer being utilized, although some of those in the east end of the site probably were. Zone B in the east trench, while it had no features or significant concentrations of artifacts and ecofacts, did have a few patches of charcoal and ash on it suggesting the top was an actual occupation even if much of the lower portions were alluviated into the area. Although there were a large number (over 8,000) of sherds and figurine fragments in this stratum, there were relatively few artifacts or ecofacts, and even these could not be directly connected with an actual floor. For this reason it is difficult to say anything very definite about the way of life at this time. What we can surmise is that it was not very different from that of the previous occupation.

Like the previous Santa Maria occupations, there was a wide variety of figurine types represented both in the occupation to the east as well as in the layer of fill to the west. Perhaps one of the most interesting things about them is that now many of them seem to have more affiliations with the Oaxaca area and the Monte Alban I sphere of influence than with the Gulf Coast. The Matamoros type, Multi-hairknot type, Monte Alban Outlined Eye type, the Capped Doughnut Eye type, and the Big Nose type all have similarities to those of Oaxaca. This shift to connections with Oaxaca is also reflected in the Tehuacan pottery, for Quachilco Gray is one of the dominant types. There is some evidence from the diorite in the clay of this type that many of these may be direct imports into Tehuacan from Oaxaca. Perhaps by now Tehuacan had come under Oaxacan religious and political dominance, but even if this were so, the artifacts and ecofacts reflect the same old way of life continuing in the villages.

Deer bones, rabbit bones, turtles, birds, and dog bones indicate hunting, trapping, and the use of domesticated dogs that probably only supplemented their diet from agricultural produce. In the archaeological record this is manifested by the metate and mano fragments, hammerstones, and stone bowls, and perhaps the chipped side-scrappers, bifaces, and choppers. A crude long flake end-scraper and metapodial awl may indicate that skin working continued, as did some artistic activities, for we uncovered polished pebbles, paint palettes, and an earplug.

The many sherds with their obvious affiliations and the radiocarbon-dated Monte Alban I horizon suggest that this Late Santa Maria Occupation 13 occurred in the general time period from 250 to 150 B.C.

Zone B¹ and Zones B and B¹

These one or two zones seem to represent deposits

of colluvium and refuse that capped the early occupation and represent the period when Coatepec was dying out as a major center in the Tehuacan Valley. Neither one of these strata had any evidence of actual living areas, but the artifacts and ecofacts do suggest that there were still some occupants of the site with a way of life not unlike that of the underlying Zone B of Ts 368e.

Evidently, the top of this alluvial stratum lay bare for some length of time, for intruding into its surface in the south edge of Ts 368e was a Palo Blanco 2-meter-long (north and south) pit with an adolescent burial (Burial 1) in it. The body had been laid on its back with the head to the south, four large slabs placed along the eastern edge of the pit, two Quachilco Gray pots placed south of its head, and then the pit had been filled.

One radiocarbon determination was derived from near the top of Zone B¹ of Ts 368e, 45 ± 100 B.C. (*Radiocarbon* 11:100). Whether this dates the time of the Palo Blanco burial or the final period of Santa Maria deposition is difficult to determine, but it was one or the other.

Zone A

The final deposition of the Coatepec site was a gray-brown humus-like soil about 200 meters thick. Except for a few nails and glass, the only archaeological materials were sherds of the Venta Salada Phase. No actual evidence of a Venta Salada occupation was found, but modern erosion and agricultural endeavors may have obliterated such. This site gave us a long ceramic sequence, had beautiful stratigraphy for the Formative, but unfortunately was dug in such a manner that all of its potentially rich contextual information was not realized. It is our hope that there will be future investigators of this site, with somewhat better techniques, who will bring some of this fine contextual information to light. Lots of luck.

The Las Canoas Site

During the excavation of the Ajalpan site in April 1962 we were constantly on the lookout for other stratified Formative deposits, and near the end of that month we discovered the Las Canoas site. This was an area about 600 meters south of Ts 204 at the edge of the east side of the Rio Salado and about 150 meters north of the Las Canoas aqueduct. Here, as at the Ajalpan site to the north, the brick diggers had dug out extensive areas, leaving behind them small piles of potsherds and artifacts. An examination of the extensive collection from Las Canoas yielded many white

sherds. These we referred to as being like Chiapa de Corzo II, like those found in sparing amounts and in bad contexts in Zone A-B of Ts 204. Here was our chance to get a good sample of Middle Formative cultural remains in better contexts.

We examined the banks of the clay pits, and then Peterson vertically cleaned off the banks east of the pits for a distance of about 60 meters to a depth of 3 meters. An examination of this long profile revealed one small section in the northeast with three well-defined occupational strata, and this we chose for excavation. Actual test excavations there were postponed until work was finished at Ajalpan. On the 16th of May, 1962, Peterson laid out an L-shaped test trench along the cut-away bank left by the brick-clay quarry and the erosion of several years' abandonment. One arm of the trench ran due north-south and was divided into two units, called "Squares 2 and 3 of Trench 1"; the other arm ran east-west and had only one unit, "Square 1 of Trench 1." Each of these three units was a rectangle a meter wide by 2 meters long. They were dug alternately, first Squares 1 and 3 on May 16 and then Square 2 on May 17.

From the 17th through the 20th of May, Peterson continued testing operations with a crew of six workers. An additional 13 squares, each a meter on a side, were set into the site at varying intervals in an effort to determine the depth and nature of the deposit and the area of clearest stratigraphy. Eventually it was decided that the spot best suited for excavation adjoined Peterson's original Trench 1, the area first exposed by the brick makers.

The walls of Trench 1 revealed 5 clear clay strata, distinguished by their respective colors and degrees of compactness; these were labeled with white cards marked Zones A through E. Zone E was sterile soil, sandy river alluvium with some varving or banding at a depth varying from 1.25 to 1.50 meters. Resting just above it was Zone D, a living surface or "floor" which averaged 20 cm. thick and contained sherds of Middle Formative type. Above this was Zone C, also a Formative floor, but somewhat thicker (varying from 20 to 50 cm.). This was the highest of the unmixed Middle Formative strata.

Zone B, directly above Zone C, appeared to be the old gravel-flecked sand surface left after the abandonment of the site in Middle Formative times. Much later, villagers during the Postclassic Venta Salada Phase had settled on the same spot; their sherds had mixed with the Formative pottery already lying on the surface and they had evidently scuffed up additional older materials while digging pits and post holes. As a



Fig. 79. The Las Canoas Site at the edge of the Rio Salado, as viewed from the southwest.

result, Zone B contained mainly Postclassic materials, but mixed with not insignificant quantities of the same types of Formative sherds found in Zones C and D. Zone A, the thickest stratum, ran from the present land surface to a depth of 70 to 80 cm. and contained only Postclassic material of the Venta Salada Phase (Fig. 80).

On May 20, Peterson decided to expand his excavations in Trench 1 to the north and east to include a block of 29 additional 1-meter squares. The area thereby exposed, including the richest deposits with the clearest stratigraphy available at this site, eventually came to total over 35 square meters. This was the "Main Block" excavation at Las Canoas on which the analysis and interpretation of the site is based; results of the scattered test pits are not included.

Assisted by Arturo Arbide, Peterson laid out a 1-meter grid over the area to be excavated, following the pattern he and MacNeish had used at Santa Marta Cave (MacNeish, 1962). First a line of stakes running due north-south were set in at 1-meter intervals and labeled zero (0), North 1, North 2, North 3, etc. Crossing this line at right angles was an east-west row

of stakes with the same zero, consecutively labeled 0, West 1, West 2, etc. These were the ordinate and abscissa of the grid; these and all subsequent squares took their names from the stakes in their southeast corners, which recorded distance in meters from the zero axis. For example, if a square was labeled N5W2, it meant the stake in its southeast corner was 5 meters north and 2 meters west of the zero axis. The pattern of the grid is clearly recorded in the site plan, Fig. 80.

Alternate squares were dug in this giant checkerboard until all had been taken to sterile soil. This meant that as the initial squares were excavated, surviving squares remained as columns isolated on two to four sides; thus their natural stratigraphy was visible from several directions, facilitating removal of natural layers with no mixing. Because of its thickness, Zone A was removed in 3 installments, called Arbitrary Levels 1, 2, and 3 of Zone A. All other zones were removed as separate natural layers, and all objects within them recorded by zone and square. Items such as projectile points or figurines were recorded in situ within the square as they were uncovered.

Excavation of the Main Block at Canoas was begun

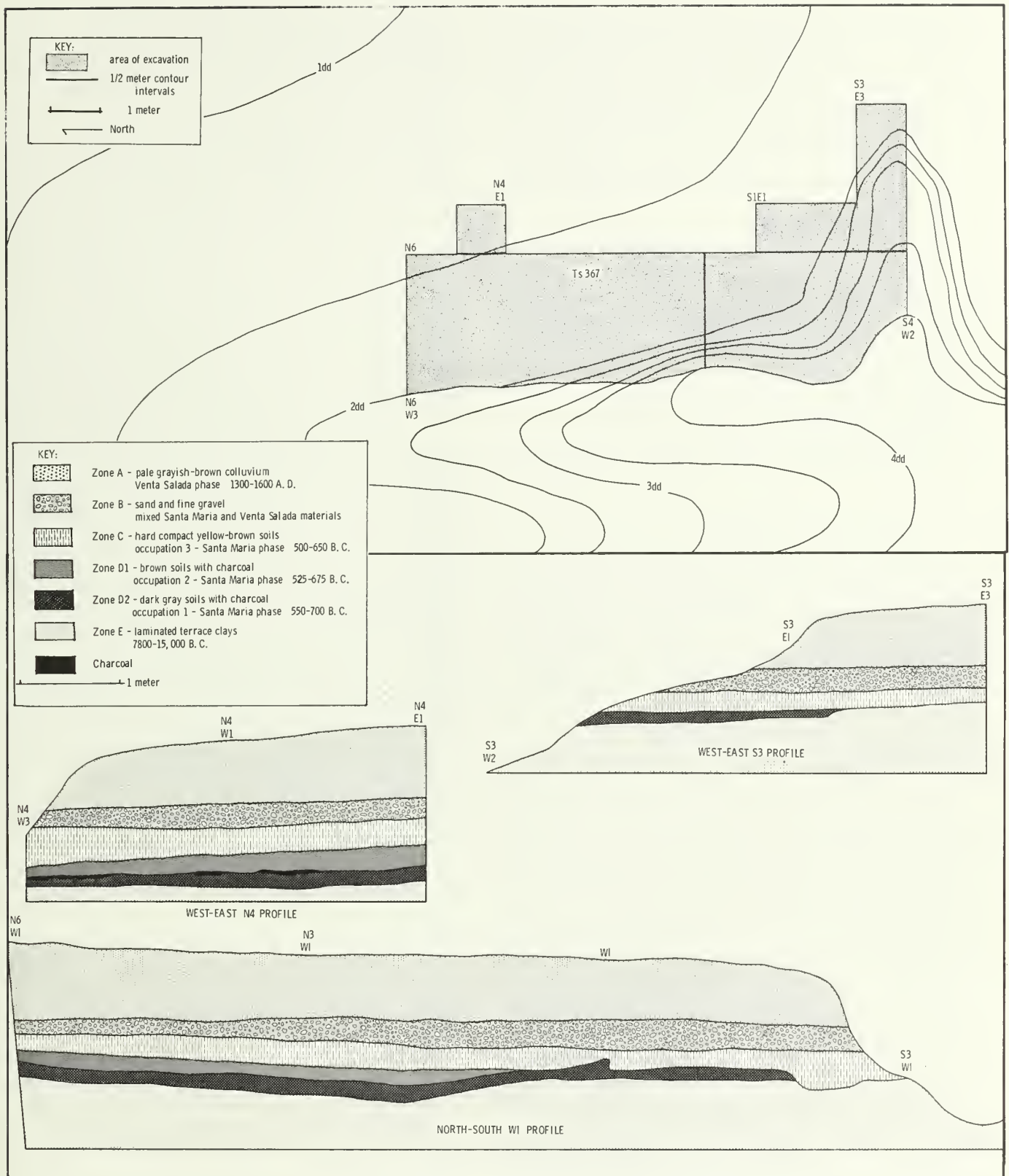


Fig. 80. Contour map of the Las Canoas Site (Ts 367) and profiles (below).

by Peterson and Arbide on May 20. On May 24 Arbide took over the operation so that Peterson could return to survey. In the central 16 squares of the Main Block a new natural stratum showed up, intercalated between Zone D and sterile soil. This layer, averaging 10-12 cm. in width, was a floor or living surface with Formative sherds and appeared to be the oldest occupation at the site. This was named Zone D², and the original Zone D relabeled D¹, making a total of five zones with cultural material at Las Canoas.

On May 28, 1962, with over 10,000 sherds recovered from the Formative strata of the Main Block, Arbide terminated excavations. At this point it appeared that the area with clearest stratigraphy had been adequately sampled, and that the lower three zones (C, D¹, and D²) had yielded the hoped-for collection of unmixed Middle Formative materials.

Later, in the winter of 1964, F. Johnson recleaned the profiles and took carbon samples from the various strata. The cultural sequence is outlined in Table 9.

TABLE 9
Sequence in the Las Canoas Site (Ts 367)

	Zone A	<i>Venta Salada Phase</i>	1300-1600 A.D.
	Zone B	<i>Santa Maria and Venta Salada Phases</i>	
Occupation 3	Zone C	<i>Santa Maria Phase</i>	650-500 B.C.
Occupation 2	Zone D ¹	<i>Santa Maria Phase</i>	675-525 B.C.
Occupation 1	Zone D ²	<i>Santa Maria Phase</i>	700-550 B.C.
	Zone E		15,000-7800 B.C.

The Way of Life of Zone D²

Zone D² occurred only in the northern part of our excavation from the S1 axis to about N5 from the 0 north-south axis to at least W3. It may have extended further westward and appeared to have been a roughly rectangular pit about 10 cm. deep. It was full of fragments of burned wattle-and-daub and was capped in places by a definite ash floor. This was the hearth area about 30 cm. in diameter and 10 cm. deep with its center at about N1.5W1.8. We believe it represented a burned house area and that the artifacts and ecofacts uncovered were used in that household. The area of Early Santa Maria remains in this clay pit suggest this occupation was linear in shape and that the line or lines of houses in this hamlet paralleled the Rio Salado. Exactly how many houses there were or how far apart they were cannot be told from Ts 367, but data from Coatepec suggests they were quite close together. Although we found no post holes, fragments of wattle-and-daub allowed Kent Flannery to reconstruct what

this house was like, and we believe this reconstruction is relevant to the parts of houses both in the early Ajalpan site as well as at Coatepec of longer duration. The shape of the shallow pit called Zone D² suggests this house was roughly 5 to 6 meters long and about 3 meters wide. Outside plaster with right-angle corners from Zone C of Ts 367 as well as from Zone F of Ts 368e and the pit called Ts 204C reveal that these houses were rectangular. Impressions on the inside of these corners show that there were corner posts from 12 to 18 cm. in diameter that we estimate were about 1 meter high. There were also a few interior impressions of larger posts ranging from 15 to 25 cm. from Zone D² as well as from Zone F¹ of Ts 204, the pit of Ts 204C, and Zones K¹, J, F, and C of Ts 368e. Whether these were poles to brace side walls or taller end uprights to hold a ridge pole is difficult to determine, but we suspect they may have been both. Johnson in his 1964 digging found charred grass impressions which suggest some sort of thatch gable roof, but the evidence is not good. The majority of the impressions of interior parts of walls here as well as at Coatepec or Ajalpan were, however, of much smaller poles or cane from about 11 to 30 mm. in diameter. A few examples from Zone C showed some lashing together, but most of the poles that form the sides do not. Study of these impressions show that small pieces of cane were placed upright to the edge of the roof from one corner post to the other. Then this framework was plastered with clay mixed with grass. Next the interiors and exteriors were smoothed off, and the exteriors usually covered with adobe plaster. From D², 4 of the 13 were polished, and 6 were whitewashed. Although we made no exact counts, these proportions seem about the same for the Santa Maria floors of Coatepec, but there were some red-painted specimens. This was not true for the Ajalpan specimens from either Ts 368e or Ts 204 where red-painted specimens far outnumbered white ones or polished ones, and plain smooth ones outnumbered all of them put together. Some specimens of adobe bricks occurred in Zones C and D¹ of Ts 367, but Flannery believes those were for flooring. No adobe occurred in Zone D² nor was any found at Ajalpan. Adobe bread-loaf-shaped bricks were much more common at Quachilco and more prevalent in Late Santa Maria times than in the early floors of this phase. Further profiles suggested they were used not just as flooring, but as steps for the pyramid at Ts 368w, braces for walls or foundations, or even as the low side walls themselves. Also, at Coatepec there was a suggestion that slabs of rock were used in a similar manner. Thus, although our data is far from adequate we do get some infor-

mation about the architecture of Santa Maria from Ts 367. The artifacts and ecofacts also inform us concerning other aspects of the culture of the people in this house at this time.

Again, one of the more remarkable aspects of the objects found in the house was the large number of figurines: 7 heads and 14 other fragments from at least 11 or 12 whole specimens of at least 6 or 7 different types. Most of these types—Hollow Lowland, Crescentic Cap, Ploughed Eye, Tres Zapotes Chin Strap, and Negroid with Hairknot—are like ones from the Olmec area of the Gulf Coast, and the first 3 types are made of clay foreign to the Tehuacan Valley. It would seem that the Tehuacaneros of this house not only adopted the gods of foreign cults, but, by importing the statuary representing them, held a veritable pantheon within their house. Other objects of a ceremonial artistic nature were a rectangular jade pendant, polished mineral, a paint palette, and a clay whistle all within the house. Lest someone get the idea that this house was some sort of religious or ceremonial edifice, let us hasten to note that the majority of artifacts and ecofacts indicated that their activities were of a most mundane nature. Although hunting was on the wane at this time, we did uncover bones of deer, gopher, 2 dogs, and a Garyito and an Aberrant triangular point. More prevalent than these evidences of subsistence activities were ones connected with grinding of seed of agricultural produce, such as the manos of various kinds (spherical, oblong, and long lenticular in cross-section) as well as the metate fragment, and the piece of saucer-shaped lipped metate. Other artifacts connected with food preparation or skin preparation included a large number of types of fine blades, an end-of-blade scraper, and a fine bifacial knife, all of imported obsidian, as well as blocky-core choppers, cores, and flakes, all of local material, with a pebble hammer indicating some flint knapping. Sherd disks and a perforated disk hint at a concern with the textile industry.

As usual, there were a large number of sherds. The only thing remarkable about the assemblage from this house was the high proportion of bowls or plates usually with flat bottoms. Furthermore, this ceramic complex indicated that this is a component of Early Santa Maria roughly in the period from 700 to 550 B.C. The radiocarbon determination of 635 ± 130 B.C. (I-911) (*Radiocarbon* 11:102) is in agreement with this estimate for Occupation 1.

The Way of Life of Zone D¹

Zone D¹ was brown soil about 10 to 20 cm. thick. It capped the pit of D²; also, while it extended only

about 4 meters eastward from the bank, it could be traced north and south in the clay pit profile for about 100 meters. We would guess most of the deposit had been removed by clay pit operations west to the very edge of the present Rio Salado. It certainly represented the deposits of a linear waterway hamlet, and abounded in burned wattle-and-daub of houses of the type described for Zone D². Unfortunately, our excavation did not define the exact area of any one of them. Artifacts and ecofacts were uniformly distributed throughout the area we excavated.

Again, there was a large number of figurine fragments of three Gulf Coast types—Hollow Lowland (parts of at least 3), Trapiche Banded Helmet (parts of 3 more), and Ploughed Eye (at least 2)—as well as a Valley of Mexico Type C3d. There were other evidences of ceremonial and artistic imports: 2 jade pendants, 2 polished minerals, a puma bone pendant, a labret, a clay whistle, a clay ocarina, and 2 paint pallets.

Again, artifacts and ecofacts indicated more directly utilitarian activities that were monotonously like those of the other Santa Maria components. Perhaps the only difference here from Zone D² was the 2 celt fragments, the 2 spokeshaves, and the piece of a square polled celt, indicating woodworking. Then again, every Formative component had burned wattle-and-daub with impressions of cut sticks and logs. Perhaps the only real difference in this Santa Maria period was the tendency toward more celt fragments than adze, which had been more popular in Ajalpan times. This may reflect a slight difference in their techniques of chopping wood; still, every group worked wood.

As previously, there were deer and rabbit bones and bones of at least 2 dogs with a Garyito and a Matamores point (indicating meat-obtaining activities) along with 3 muller-mano fragments, an oblong mano, 2 long ones lenticular in cross-section, and a long one triangular in cross-section. Also found were 2 metate fragments, 2 ovoid plano-convex metates, and a basin metate, recalling activities concerned with seed food preparation, probably from agriculture. A split bone awl, a metapodial awl, a graver, fine ovoid end-scrappers, and a flint drill; and pebble hammers, flakes of local rocks, cores, and many blocky cores and ellipsoidal choppers, may be taken as evidence of a concern with skin preparation and flint knapping, respectively. Some fine blades and bifaces also occurred, along with perforated disks for spindle whorls.

Sherds were again abundant showing a great emphasis on the use of various kinds of specialized flat-bottomed bowls. The sherds also allowed us to classify

this component as of Early Santa Maria times from about 675 to 525 B.C. Two radiocarbon determinations (I-893, I-917) (*Radiocarbon* 11: 101, 102) gave dates averaging 608 ± 87 B.C. (Occupation 2).

The Way of Life of Zone C

Zone C was somewhat different from the earlier zones. It was of a hard compact yellow-brown soil, and thicker (30 to 50 cm.), with a few patches of ash which suggested living floors. Although we have classified it as an occupation, probably much of the deposit represents refuse dumping or wash from nearby living areas. Again, examination of the profiles of both the excavation and clay pit operations showed the deposits as quite extensive, certainly 150 meters long and perhaps extending 100 meters back from the river. The refuse was from a large hamlet. Study of sherds from Coatepec's eastern mounds suggested that this hamlet was oriented toward that nearby ceremonial center. Whether or not the earlier components were is still open to question; this one, however, certainly was.

Again, the ecofacts and artifacts indicate the same old Santa Maria mundane activities. Tortugas and Garyito points with bones of a deer, 3 rabbits, 2 dogs, and a gopher indicated meat-getting activities; and mortar, mano, and metate fragments, oblong manos, long manos, triangular or lenticular or round in cross-section, and ovoid metates showed a concern with preparation (seed from agriculture). Adze and celts indicated woodworking. Crude disk and fine flat end-scrapers with flat bone needles and awls showed a concern with skin preparation; cores, choppers, and flakes with hammerstones, flint-knapping activities; sherd disks, textile making. An earplug, pendants, and a rubbed pebble showed a concern with artistic endeavors, and so forth.

All of this was boringly the same, and is thus cursorily dismissed. However, Zone C had many examples of another activity which we have only touched upon previously and have usually put under the general rubric of "trade." The jade pendant, olive-shell tinkler, and earplug were specialized artistic objects made elsewhere. Many of the Helmeted, Hollow Lowland, Ploughed Eye, Negroid with Hairknot, and Valley of Mexico Type Di figurines were ceremonial objects with religious overtones that had been imported. The obsidian blades seemed to have been made elsewhere and traded in as complete products (as we found no obsidian cores or chips in the refuse), as were 51 trade sherds from about 40 different vessels. On a more mundane level were mollusk shells and metates made of volcanic rock from Laguna del Seco in Puebla, and

our cave materials hint that various kinds of corn, beans, and fruits were entering this region from elsewhere.

What does all this mean in terms of "trade" and cultural activities? These objects may best be understood by looking at them as the results of activities or energy flow of at least four different kinds of exchange systems operating during Santa Maria times. One system that was still in existence goes back to Ajuerado times and might have been the only system operating during that earlier phase. We call this the *indirect procurement system*, an informal system of contacts between groups or individuals living in nearby regions and exchanging artifacts, raw materials, ideas, and concepts. We found complete obsidian artifacts, chunks of volcanic tufa, and some foodstuffs foreign to the region. Furthermore, it may have been that some of the ideas of artifact styles and technological concepts of the Tehuacaneros, gained through casual and spasmodic contacts with adjacent groups, may have reached those groups in a similar manner. Such a system is difficult to document in Canoas levels, but in the Ajuerado Layer 6 of El Riego Cave, what we called trade materials—the obsidian flakes and an obsidian Plainview point, the volcanic tufa, the mano, the stylistic forms of the tools, and the flint-knapping technological innovations—were all fine examples of the results of the indirect exchange system. In terms of formal characteristics, this system would have been one of: (1) indirect procurement of (2) products not made by specialists (3) procured and distributed by non-specialists (4) in an informal manner to (5) non-specialized consumers.

A second older system, called the *direct procurement system*, was probably also still in existence during Santa Maria times, having begun in late El Riego or Coxcatlan times. It was equally difficult to document. Here one or more non-full-time working individuals would have transported products directly from a particular source of raw materials, or a particular locus of production of non-specialized artifacts, and would then have distributed them in an informal manner to the non-specialized consumer. Obviously such a system also spread ideas, concepts, and techniques from one group to another. The best examples of the results of such a system may be seen in the Coxcatlan levels of Coxcatlan Cave which will be described shortly. The 31 marginella sea shells with the burial in the El Riego Zone XIV of Tc 50 is one example, and an even better example is the caches of unworked or early partially-worked volcanic tufa and obsidian in the Coxcatlan Zones XIII and XI of that cave. The characteristics of

such a system would have been as follows: (1) direct procurement of (2) raw materials of products not made by specialists which (3) were procured and distributed by non-specialists or semi-specialists in a (4) informal manner to (5) non-specialized consumers.

These two systems probably continued to exist through Santa Maria times, by that time being overshadowed by another system which probably began in Ajalpan times. We say this because we believe the San Marcos Level C¹ and the lower components of the Ajalpan site had the best end-products of this third type, which we call the *folk market system*. Procurement would have been direct and from sources or groups who were not full-time specialists in the production of these items, although some might have been artisans. Such individuals during Santa Maria times would have been farmers, obsidian blade makers, mano and metate makers, and perhaps the lapidary workers who lived away from Canoas. These materials would have been procured, transported, and distributed by full-time specialists, the so-called "traders." Further, materials would have been distributed in a formal manner, either in a market or by some sort of door-to-door selling, to consumers who might or might not have been full-time specialists themselves with specialized or non-specialized products or services to exchange. Thus, the characteristics would have been: (1) direct procurement of (2) materials produced by non-specialists or by part-time specialists (3) by merchants who (4) distributed them in a formal manner to (5) specialized or unspecialized consumers.

This system, undoubtedly an important one during Santa Maria, was augmented by a new system which began at that time, the *socio-ceremonial exchange system*. This system would have had many resemblances to the previous one. Procurement would still have been by direct means, but now the products obtained would have been manufactured by artisans, home industrial specialists, and full-time specialists not working on a mass production basis and not living in a specialized area (*barrio*). The agent of procurement and distribution would have been a full-time specialist (perhaps aided by assistants) who had affiliations with some sort of ceremonial or religious organization. The real difference here would have been the manner in which the materials were distributed to the specialized or non-specialized consumer. Goods such as figurines and perhaps jewelry and other luxury items would have been redistributed in or during such specialized ceremonies as birth ceremonies, marriage ceremonies, death ceremonies, the corn-growing dance, etc. Such ceremonies

and their redistribution aspects would have, of course, reaffirmed the status of the ceremonial leaders as well as united the collective group. This is how we see the development of exchange systems up until the close of the Formative; obviously, other systems developed later.

The sherds and other artifacts indicated that Zone C was a component near the end of Early Santa Maria times, roughly from 650 to 500 B.C. Two radiocarbon determinations (I-899, I-902) (*Radiocarbon* 11:101, 102), one of which could have included older carbon dumped in with it, averaged 775 ± 106 B.C. (Occupation 3).

Zones A and B

The final story of this site probably happened long after the initial occupations. The next event that seemed to have occurred was the deposition by alluviation of a sandy layer, Zone B, which included not only materials from old Santa Maria levels, but also some from some unknown Late Venta Salada component. This stratum was from 20 to 30 cm. thick. Still later, a thicker stratum of gray-brown clay, Zone A, slowly flowed onto the surface of Zone B. This evidently occurred during Late Venta Salada times, for included in the colluvium were artifacts of that time period. This ended the history of the Las Canoas site, important only for a brief period during Middle Formative times.

The Quachileo Site

This site, almost exactly 3 kilometers south of the southern limits of the town of Altepexi is in the Valley Center Steppes environmental zone. Crossed by the road to San Jose Miahuatlan, it is surrounded by cornfields watered by a series of irrigation ditches which flow down from Altepexi or from the Atzompa spring at the base of the scarp a couple of kilometers southwest of Altepexi. Fossil prehistoric irrigation ditches passed to the east and west of this site.

The site itself falls within a westwardly V-shaped alignment of twelve nebulous Venta Salada salt mounds (Fig. 81). The central plaza of the main part of the site is rectangular (160 meters NNW and 120 meters ESE) and is surrounded by a causeway about 2 meters high and 20 to 50 meters wide. On the north side of this plaza is a large rectangular mound with a wide staircase entering the plaza. There are indications that it may have been flanked by two small mounds. On the eastern side of the surrounding causeway there is a similar situation, but this rectangular truncated pyramid is even larger (50 by 60 meters), and there is some evidence of a large staircase entering the



Fig. 81. The north end of the plaza of the Quachilco site (Ts 218), as viewed from the southeast.

plaza. A couple of flanking bumps indicate that perhaps it too was flanked by smaller pyramids spaced symmetrically on the causeway. About 15 meters to the west of the causeway are two matching long (40 by 15 meters), low (1.5 meters) pyramids. Within the eastern half of the plaza itself were three small platforms, erroneously identified in the survey notes as a ball court. The southernmost one is about 15 meters north of the southern causeway with its eastern end about 15 meters from the eastern causeway. It is about 10 meters wide, almost 60 meters long east-west, and only about 2 meters high. Another small mound parallels the center of the eastern causeway and is about 20 meters to the west of it. It is about 20 meters long north-south, 15 meters wide, and about 3 meters high. It faces a small platform in the center of the plaza which is about 25 meters long, 15 meters wide east-west, and 3 meters high (Fig. 82).

The site was found in the summer of 1961 by F. Peterson and a large surface collection was made. Many of the sherds were of Palo Blanco types, and the extensive architectural features seemed to indicate that it was of that Classic Period. A few sherds and figurines of Santa Maria times, however, indicated the possi-

bility of a stratigraphic sequence from Santa Maria well into Palo Blanco. Other sites had given us a long Formative Period ceramic sequence, and, based upon discussions in the spring of 1962 while Ajalpan, Coatepec, and Las Canoas were being dug, it seemed possible that here was where we might complete our long stratigraphic column. With stratigraphic materials from this site, we felt that we might be able to bring our column up from the Formative through most of the Classic. Thus, by the time MacNeish left for Canada, we had planned to dig this site and so get the Palo Blanco end of our sequence.

Excavation had to await completion of work at Coatepec, so it was not until August 9, 1962 that many of the same crew and the same student supervisor who had worked at Coatepec transferred their efforts to Quachilco. Unfortunately, they brought along their own digging techniques and unique method of recording information. These fortunately were not used in our other 20 or so excavations; however, at Quachilco the same techniques used in the organization of the excavation at Coatepec were allowed to evolve (and we use the word in a retrogressive sense).

Exactly what their plan of excavation was (if, in

fact, they actually had one) is difficult to discover as can be seen in the helter-skelter pattern of tests on the contour map. The first operation was digging Test 1, a 1-by-2-meter north-south trench on the north apron of the large mound on the north causeway. Beautiful stratigraphy to a depth of about 4 meters had good possibilities of eventually yielding a considerable amount of information about the village life of the inhabitants of the site. So further excavation ceased! Actually, all operations should have ceased by this time because Palo Blanco remains (the recovery of which was the purpose for digging the site) only occurred in the top mixed stratum of Zone A. The bottom eight or nine strata contained sherds monotonously like those from the upper levels of Coatepec, of which we already had too many. However, there were evidently far too many workers to quit now, so they pushed on and dug a 1-by-2-meter east-west trench, Test 2, near the northern mound's west end and a trench of the same size at the east end, Test 3. Neither trench had stratigraphy as good as Test 1; they were full of masonry from pyramid building; and Palo Blanco sherds were only in a top mixed Zone A. So they pushed on and dug a 2-by-2-meter test, No. 4, on the plaza at the south-east edge of this mound, and another test of the same size, No. 5, on the east end of the mound with the same results. Exactly what the nature of this architectural feature was cannot be determined from the notes, and no photographs were taken. Still, one must admire their persistence if not their skill. Therefore, they dug Test 6, this time at the southern flank of the large mound on the eastern part of the causeway. This trench, which was cruciform, 3-by-3 meters, gave rather good stratigraphy, although its middle levels contained architectural features. Next, a 2-by-2-meter trench, No. 7, was dug in the plaza in front of the large mound to the north. Since Test 5 at the east end of that mound had little in it, they dug another 2-by-2-meter test, No. 8, just 2 meters north of Test 5. Both yielded little but had architectural features. The next test, No. 9, was a 1-by-1-meter hole some 50 meters east of the north end of the large mound to the east, and it yielded even less, so back to the area of Tests 5 and 8 at the east end of the north mound for Test 10. For some unknown reason, this was to become the major excavation at the site, and a grid coordinate system was set up which was never tied in to any of the other tests. In this test, 2 north-south trenches 1 meter wide were dug parallel to each other, one between the 0 and W1 profile from S2 to N4 and the other between the E4 and E5 profile from S5 to N1. Next, a cross trench between the 0 and S1 axes con-

nected the west trench with the east one and then was extended some 3 meters farther east. This trench then was extended one meter to the north as well as the same distance to the south. The excavation concluded when a few more squares were dug northward, but later abandoned as they struck architectural features. During this excavation, there was a tendency to dig alternate squares, and the workmen stripped off the six stratified zones very skillfully, labeled the materials accurately, and cleaned off the burials and architectural features beautifully—after all, many of them had been trained for a year under five or six topnotch archaeologists. Unfortunately, the recording did not come up to such high standards; only a few photographs, mainly of burials, were taken; no daily diary was kept; the square descriptions and various forms for special features gave little or no information; the profiles, while well-linked and numbered, were incomplete and did not cross-check; and finally, there were no descriptions nor drawings of any of the architectural features. The situation was the same in the final Test No. 11, an L-shaped, 1-meter-wide, 5-meter-long trench in the southeast corner of the plaza. It, however, had one redeeming virtue the others did not have: it marked the close of the dig.

Tr 218, dug in the manner it was, gave little new information about the ancient inhabitants' culture, except perhaps burial customs. However, it did yield about 100,000 sherds in stratigraphic contexts that were boringly like those from the upper levels of the Coatepec site. After many hours of washing and numbering, the dull process of classifying the mass of monotonous gray ware from the 3 tests, 6, 10, and 11, with adequate samples re-affirmed the sequence of Late Santa Maria. Further, comparisons of the assemblage of pottery types from the various zones of the 3 tests allowed us not only to correlate them with each other, but also to get a glimpse of the sequence of occupations at the site. The sequence in outline is summarized in Table 10.

Because the information, though meager for each zone, came from a variety of zones and from a variety of tests, a sequence of cultural events at Tr 218 becomes clear, as can be seen in the following pages.

The Way of Life of Zone G (Test 11)

The earliest Occupation 1 uncovered over the sterile subsoil was Zone G of Test 11, a yellow sandy clay between 10 and 30 cm. thick. The 3 fragments of wattle-and-daub, absent from other tests, suggest that perhaps the first occupants lived in a relatively small hamlet in the middle of the plain.

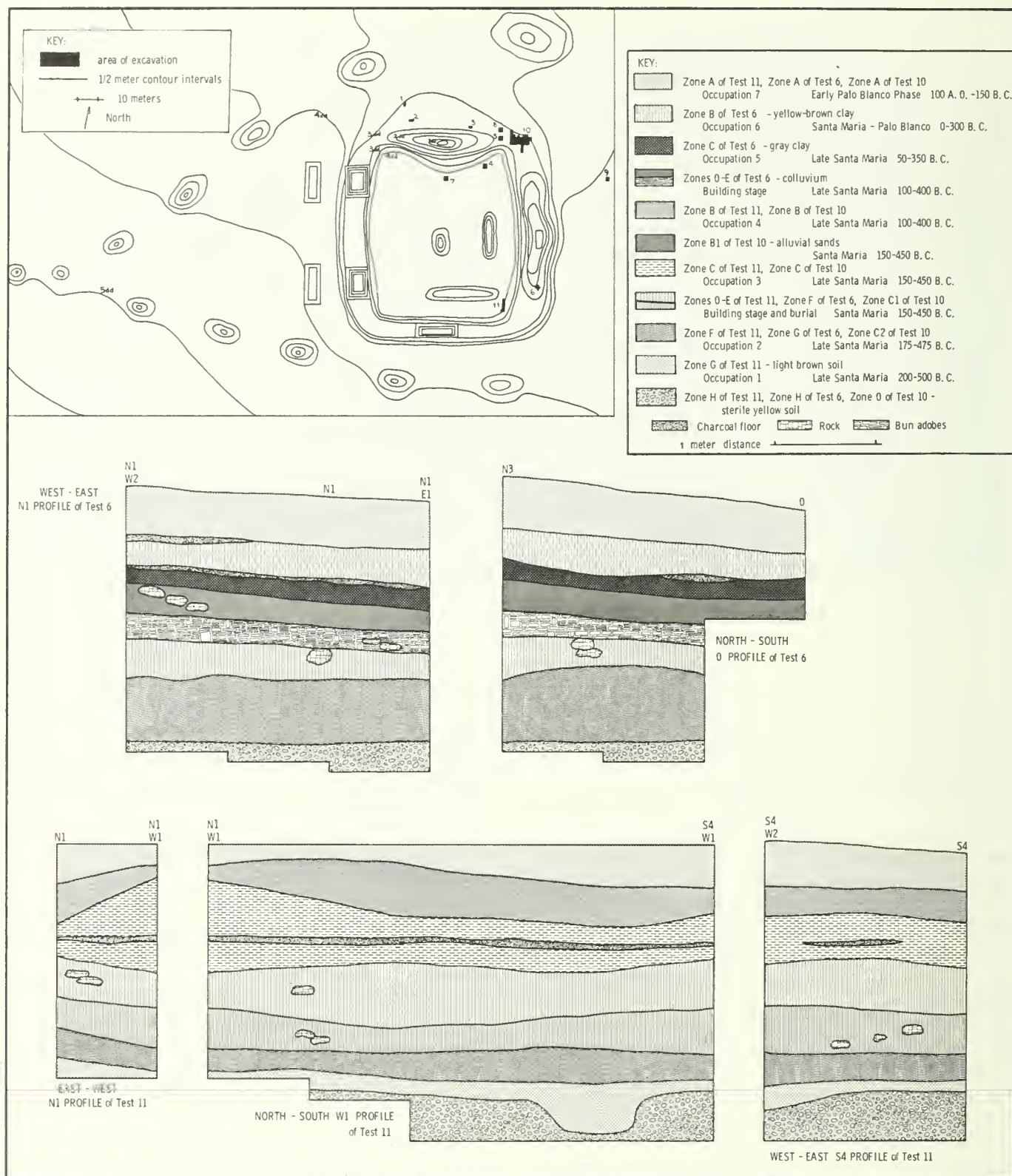
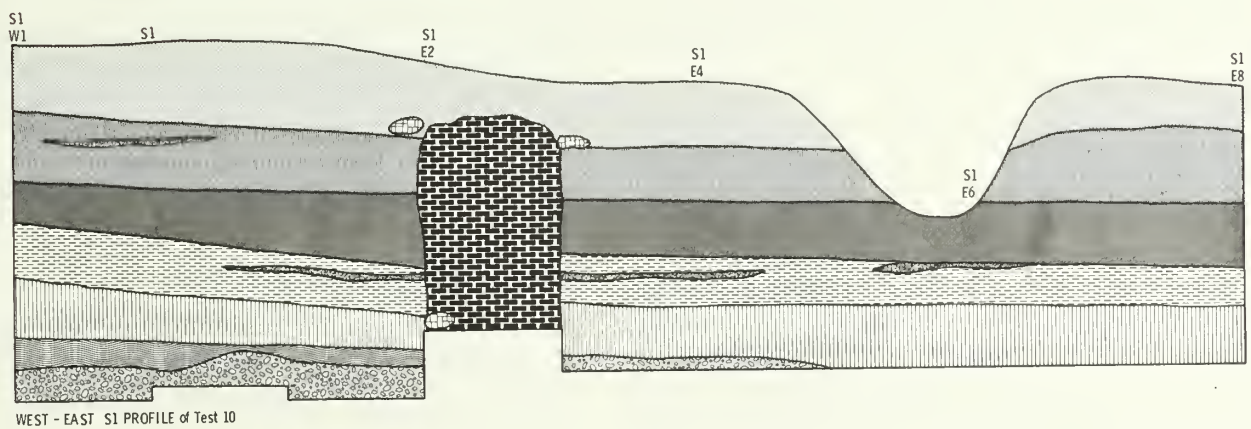
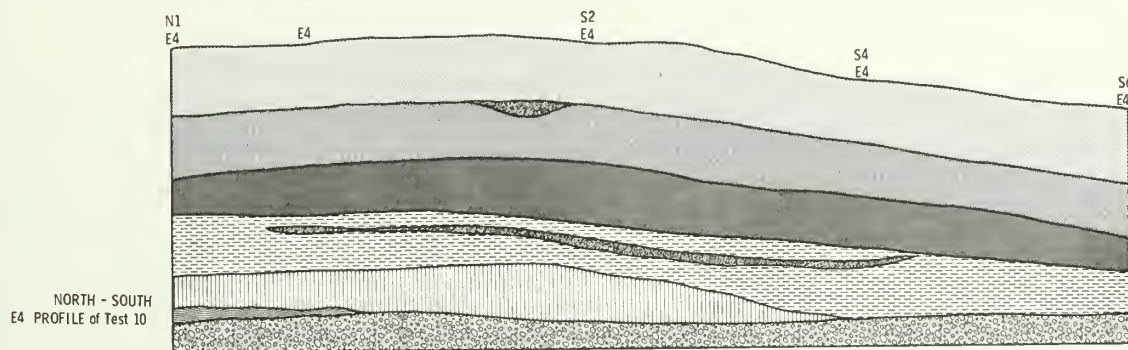
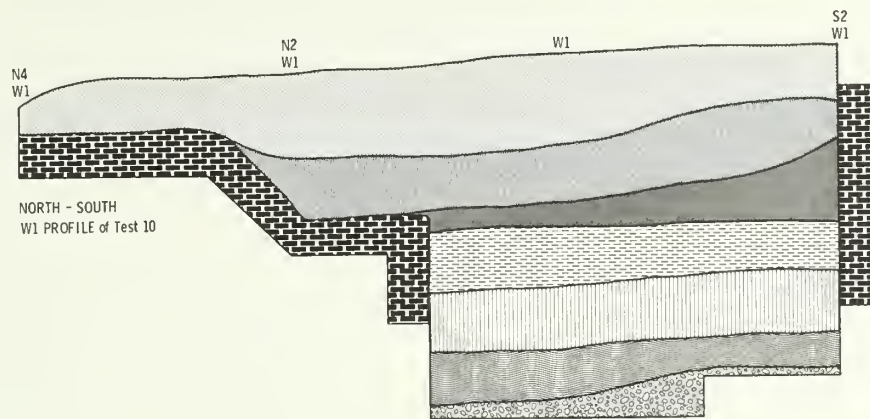


Fig. 82. Contour map of the Quachilco site (Ts 218) (top) and profiles of Test 6 (middle), Test 11 (bottom), and Test 10 (facing page).



(Fig. 82 continued)

T A B L E 10
Sequence in the Quachilco Site (Tr 218)

	Test 11	Test 6	Test 10	
	<i>Early Palo Blanco Subphase</i>			
Occupation 7	Zone A	Zone A	Zone A	150 B.C.–100 A.D.
	<i>Santa Maria and Palo Blanco Phases</i>			
Occupation 6		Zone B		300 B.C.–0 A.D.
	<i>Late Santa Maria Subphase</i>			
Occupation 5		Zone C		350–50 B.C.
Building stage		Zones D-E		400–100 B.C.
Occupation 4	Zone B		Zone B	400–100 B.C.
			Zone B ¹	450–150 B.C.
Occupation 3	Zone C		Zone C	450–150 B.C.
Building stage and burials	Zones D-E	Zone F	Zone C ¹	450–150 B.C.
Occupation 2	Zone F	Zone G	Zone C ²	475–175 B.C.
Occupation 1	Zone G			500–200 B.C.
	Zone H	Zone H	Zone D	

Artifacts and ecofacts, except for the pottery, were scarce. The few found, fragments of bone (hunting?), a mano (agriculture), 3 blades and domed scraper-planes and flakes (butchering and flint knapping) were enough to suggest only one or two cultural activities. An arm of a figurine with realistic hands and a small fragment of the head of a Hollow Lowland figurine were found; however, the only good evidence of activity was the secondary Burial No. 7 of an adult male in a shallow pit. The teeth had caries and there was evidence of slight osteophytosis in the lower lumbar region. Social inferences about this burial are difficult to determine (see Figs. 83 and 84).

Sherds indicate this zone is a Late Santa Maria component in the general time from 500 to 200 B.C.

The Way of Life of Zone F, Zone G, and Zone C²

The next occupation seemed to be represented in each of the three tests. In Test 11, Zone F was some 30 cm. thick and of a light brown clay; Zone G of Test 6 was dark gray in color and was 50 to 70 cm. thick; and Zone C² of Test 10 was described as yellow clay ranging from 10 to 40 cm. thick. All seemed to be of the same period, as the percentages of their pottery types were similar. In these two smaller tests the same types were present in all squares excavated, but in Test 10, Zone C² over the sterile clay, artifacts covered only one ovoid portion of the area excavated (Fig. 85). No masonry or other evidence of pyramid-building was present in any of the tests. Thus, one might guess that Quachilco was still a hamlet at this time, albeit a somewhat larger one than previously.

Artifacts and ecofacts were very scarce in Tests 11 and 6 and only slightly more prevalent in Test 10, so there is little we can say about their activities. The deer, dog, and rabbit bones of Zone C² in Test 10 may be taken as evidence of hunting, the blades, chopper, and biface in each may mean butchering, and the stone bowl of Test 10, basin metate of Test 11, and pestles of Test 6 may indicate seed preparation and hint at agriculture. The fine ovoid plano-convex end-scraper of Test 10 and the labret of Test 11 and the flint chips and hammers in all tests may mean, respectively, skin-scraping, artistic endeavors, and flint knapping.

Figurines were present in all tests, suggesting ceremonial activities. The best evidence, however, was Burial 9 in Test 10 of an adult male laid on his back in a long pit with arms and legs crossed. The burial contained no grave goods (see Figs. 84 and 85).

Sherds from all tests indicated that these levels may be considered a Late Santa Maria component roughly in the time period from 475 to 175 B.C. (Occupation 2).

Zones D-E, Zone F, and Zone C¹

The next stage in the history of Quachilco was the one in which the main building of the structure began. From Zone C¹ of Test 10 (see Fig. 86) there is good evidence that some sort of vertical face pyramid (1 meter to 2 meters high) was built with a step back and then a 45° slope to another horizontal step or surface. Although in Figure 86 we have attempted to reconstruct the location of the construction, there is considerable room for error since we worked from the

profile drawing, not floor plans or adequate photographs. The other tests, namely, Zones D-E of Test 11 and Zone F of Test 6, also had some adobe and stone blocks in them indicating these too were building periods. Further, the ceramics from all of these zones were extremely similar, indicating all were roughly contemporaneous. It seems probable that not only was the causeway built during this period, but also many of the platform structures on top of it. Thus, Tr 218 had at this time evolved from a hamlet into a village or ceremonial center. Because of the location of the site in the infertile steppes and the many fossil irrigation ditches nearby, subsistence probably was based upon irrigation agriculture. Our reconstruction is of artifacts and ecofacts that basically came from refuse used as fill and not from living surfaces.

Perhaps the only activity other than structure-building that we can discuss very confidently is the burial practices found in Zone C' of Test 10 (See Figs. 86 and 87). Here five burials were uncovered just east of the construction. Nearest to the construction was the burial (No. 3) of an eight-year-old child extended and lying in a shallow pit on its right side. Further east was Burial 8, an adult male lying in a shallow pit on its back with hands crossed over the stomach region. Just south of it were three burials in a single shallow circular pit. Burial 4 in the northern portions of the pit was an elderly male that had tooth trouble (caries) and probably backaches (vertebral osteophytosis) and had been placed on its back in the pit. Also placed with its head at the knee of Burial 4 was the skeleton of a six-year-old child lying on its back (Burial 5). South of these were the bones (No. 6) of an adult female that might have been cremated. Whether this was a family group that had been sacrificed in some sort of temple dedication ceremony, or that had dropped dead during construction, or simply died and was buried here is difficult to say. It is equally difficult to interpret the meaning of Burials 3 and 8, particularly since the notes on all are brief, to say the least. Regardless of what the purpose was, it seems safe to conclude that, during this period of construction, burials took place.

A study of the numerous potsherds, some 10,000 mainly of monotonously gray ware, and figurine types suggests this layer was deposited during the period from 450 to 150 B.C. by people with a Late Santa Maria material culture.

Fig. 83. Activity area and artifacts of Zone G, Test 11 of Tr 218.

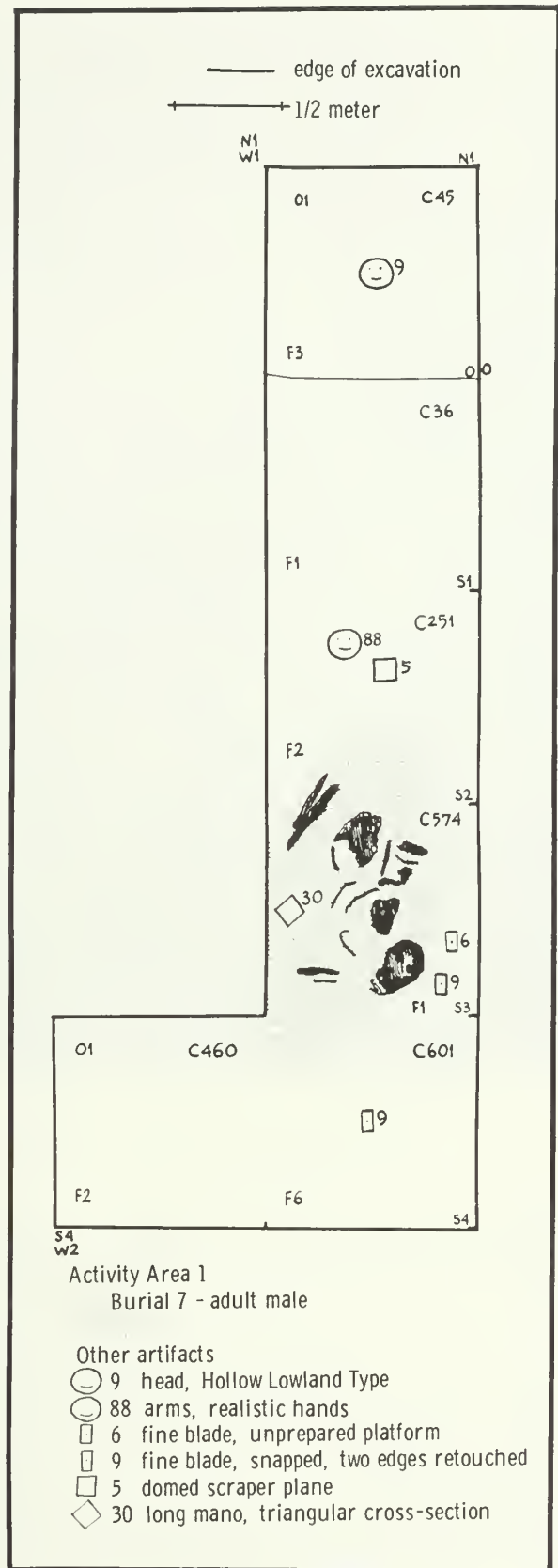




Fig. 84. Burial 7 of Zone G, Test 11 (left) and Burial 9 of Zone C², Test 10 (right) at Ts 218.

The Way of Life of Zone C (Test 11) and Zone C (Test 10)

Zones C of Test 11 and Test 10 were relatively thick layers (30 to 50 cm.) extending out from the constructed walls. Charcoal floors either directly on the zone or in the upper limits were well defined. These strata evidently represented village occupation just after the construction of the main edifices. One would suspect from a location so near a ceremonial structure that these strata were not the result of activities from habi-

tations, but rather were refuse from habitation areas. Artifacts from Zone C of Test 11 in the plaza were few—a celt, mano-mullers, a snapped blade, three figurines of three types, and many sherds—indicating that the plaza probably was not a main living area. Zone C of Test 10, nested in between a couple of ceremonial structures, did have many artifacts that hinted at the activities of the people who existed in the structure or lived nearby (Fig. 88). Wattle-and-daub bricks from the structure suggest that there were habitations in between or just in back of the mounds, but whether

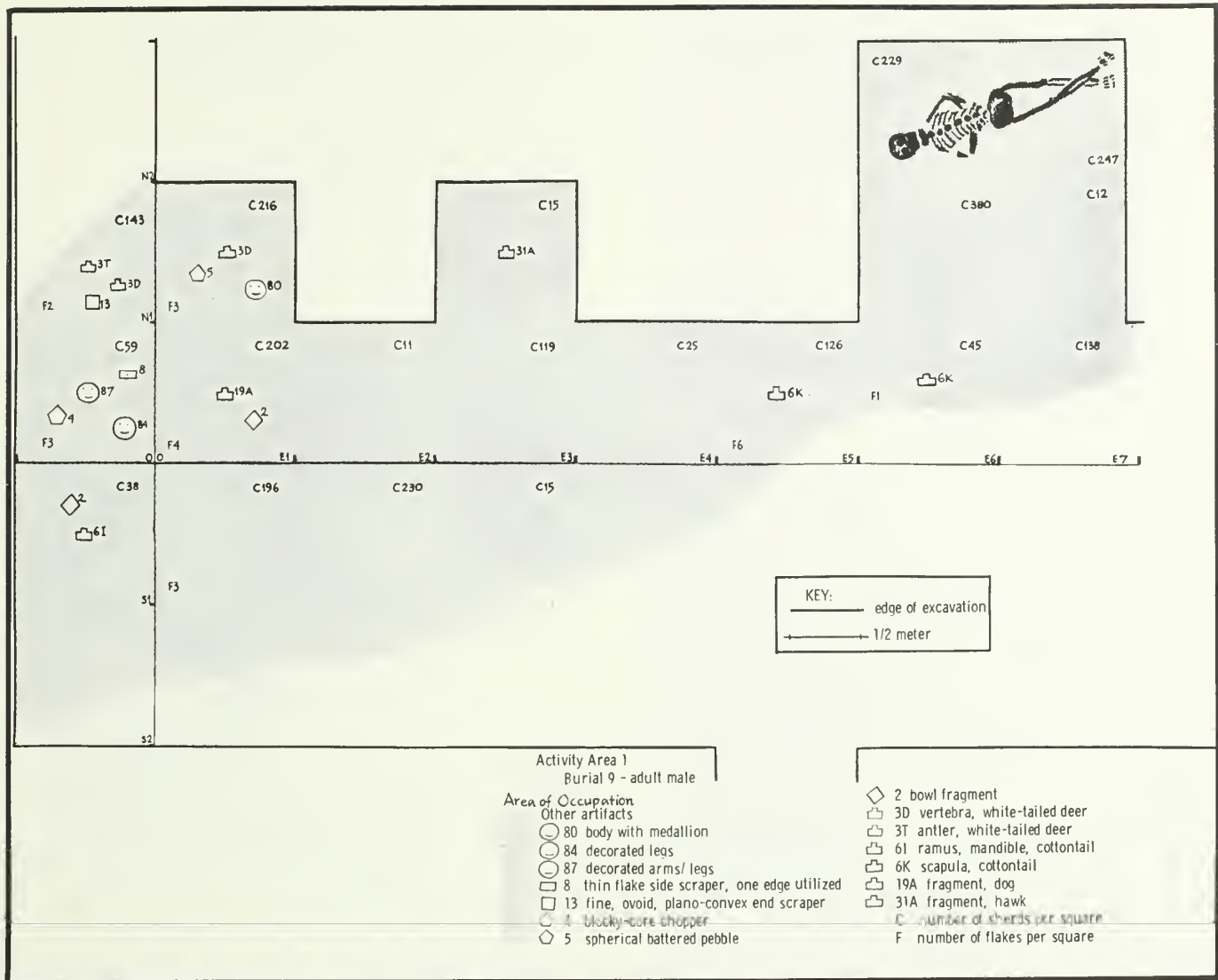


Fig. 85. The activity area of Zone C2, Test 10 of Ts 218 with a key to its ecofacts, artifacts, and burial.

they were the abodes of the ceremonial leaders, of their assistants, or of mere villagers remains to be seen.

Regardless of who or what they were, their artifacts and the ecofacts give us a glimpse of their way of life.

Like other Late Santa Maria components, there was little evidence of hunting, although a point tip and deer, rabbit, skunk, gopher, and dog bones occurred. There was much evidence of seed-grinding: fragments of mano-mullers, metates, a stone bowl, long manos, plano-convex metates, and ovoid mullers occurring. Exactly what the choppers, side-scrappers, and bifaces were used for is difficult to determine; probably they, like the many pottery vessels, were used in food prep-

aration. A gouge, 3 celt fragments, 2 square-polled celts, and an abrader saw attest to woodworking, while the pebble hammers, flake cores, and some of the choppers indicate flint knapping. The discoidal beads, square-based drill, polishing pebbles, and slab paint palettes suggest artistic activities.

Again there was a wide variety of figurine types, Ticoman, Slot Feature, Medallion-bodied, and Hollow Old Man. The latter is of some interest for this figurine type, perhaps then a cult symbol, definitely seemed to have developed into Huehue, the Old Man God, during later times; and perhaps in Late Santa Maria times, a true pantheon was being organized.

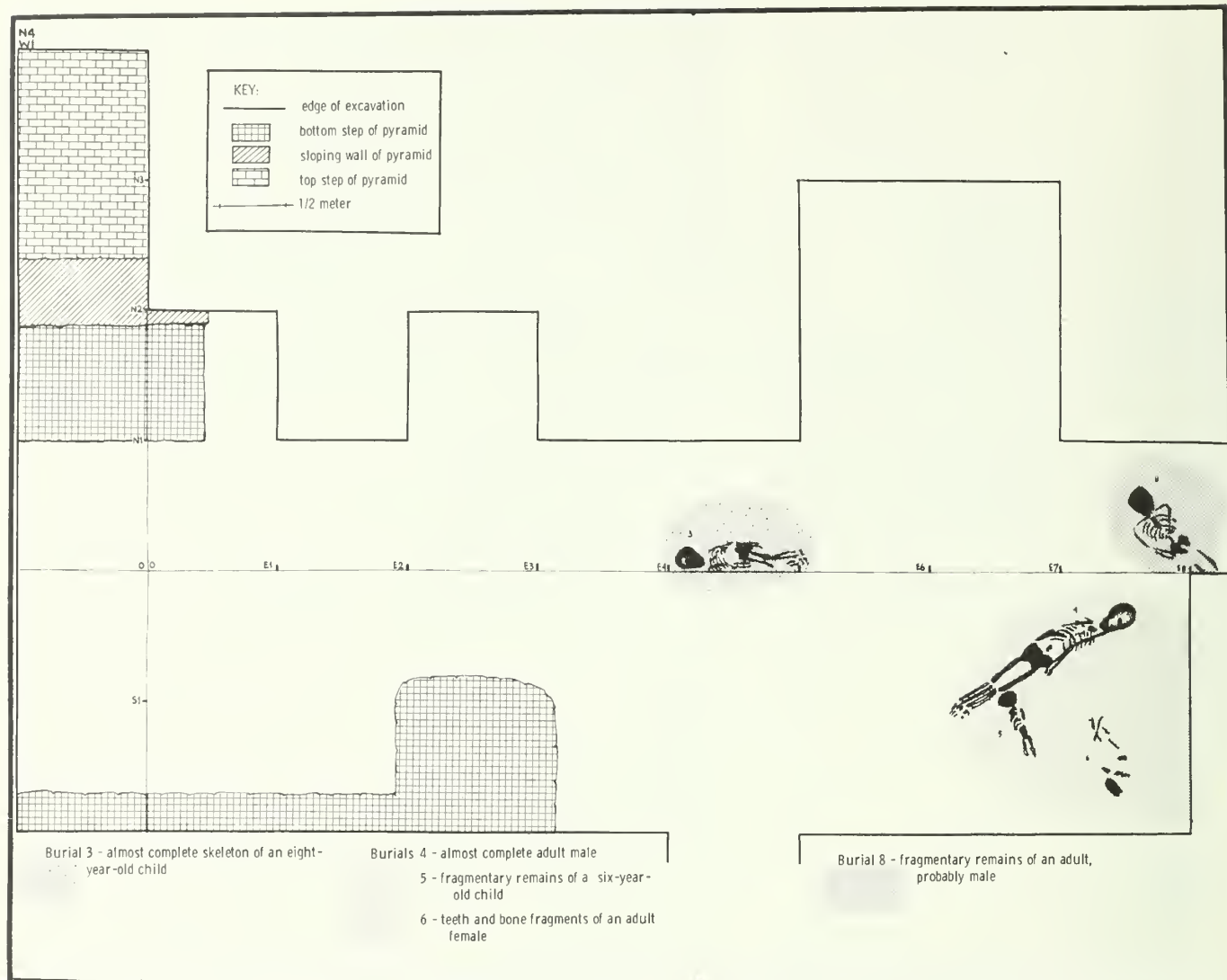


Fig. 86. The architectural features and burial 9 of Zone C², Test 10 (right) of Ts 218.

The other evidence of ceremonialism was the partially excavated skeleton of an adult male (see Fig. 89) placed on its back in a shallow pit. The bones of Burial 2 revealed he had syphilis. This implies other social activities rather difficult to reconstruct from archaeological data.

A study of the sherds indicates that this occupation No. 3 was of Late Santa Maria times, roughly from 450 to 150 B.C.

Zone B¹ (Test 10)

Overlying Zone C of Test 10 was a sandy layer containing artifacts and ecofacts which appeared to have

been washed into the area. In terms of percentages of pottery types, no comparable remains were found in other tests. The sherds hint that the layer was roughly contemporaneous with the underlying Zone C.

The Way of Life of Zone B (Test 11) and Zone B (Test 10)

These two thick layers (40 to 50 cm.) in Tests 10 and 11 covered most of the earlier deposits as well as the lower parts of the architectural features and were overlaid by the superficial Zone A of Palo Blanco times. This may mean that this was the last time all the ceremonial structures in this large village were being uti-

THE AJALPAN LOCALITY

lized. A few streaks or floors of charcoal as well as a hearth in Test 10 indicate that it was basically an occupational layer, but, except for sherds, neither test contained enough artifacts or ecofacts to allow us to say very much about the way of life of this time period. The bones of an arthritic adult male were found in Test 10 (see Fig. 89), but even these seemed to have been merely dumped into the refuse. The numerous sherds allow us to classify Occupation 4 as a Late Santa Maria component, roughly of the period from 400 to 100 B.C.

Zones D-E (Test 6)

Percentage of sherds suggests that, following the period when the whole ceremonial center was occupied, some building of new structures took place in the area of Test 6 in the south end of the eastern causeway. Both strata were about 20 cm. thick and contained large aligned slabs of rock in the refuse. Artifacts and ecofacts occurred in the refuse as part of the fill and obviously cannot tell us anything very definite about the culture of this period, estimated to be between 400 and 100 B.C.

The Way of Life of Zone C (Test 6)

After the building stage in the area of Test 6, a layer of gray clay about 20 cm. thick covered it. It was topped by a charcoal layer that looked to be an occupational floor. No comparable materials were found either in our tests in the north causeway or in the test in the plaza, No. 11. It would seem that the ceremonial center was being abandoned, and perhaps it may have reverted back to hamlet status. Unfortunately, we found few artifacts—a side-scraper, the bones of dogs, a gopher, and a quail, along with the many sherds—so little can be said about cultural activities. The sherds suggest that Occupation 5 occurred at the very end of Santa Maria times, roughly from 350 to 50 B.C.

The Way of Life of Zone B (Test 6)

Zone C was then covered by a yellow-brown stratum of clay about 30 cm. thick containing only a few artifacts and ecofacts, but many sherds. The west portion of the zone was capped by a charcoal floor, so it too seemed to have been an occupation during the period of abandonment of the site. The deer bones, dog tooth, rabbit, and gopher bones, and a thin side-scraper and a chopper fragment indicate the people there hunted and butchered their kill; other than that, we know little about them. The sherds seem to indicate that Occupation 6 occurred in the period of transition



Fig. 87. Burials 3 (top), 4 (middle), and 8 (bottom) of C¹, Test 10 of Ts 218.

from Santa Maria to Palo Blanco in the first couple of centuries before the birth of Christ.

The Way of Life of Zone A

Zone A, from 20 to 70 cm. thick, capped the whole

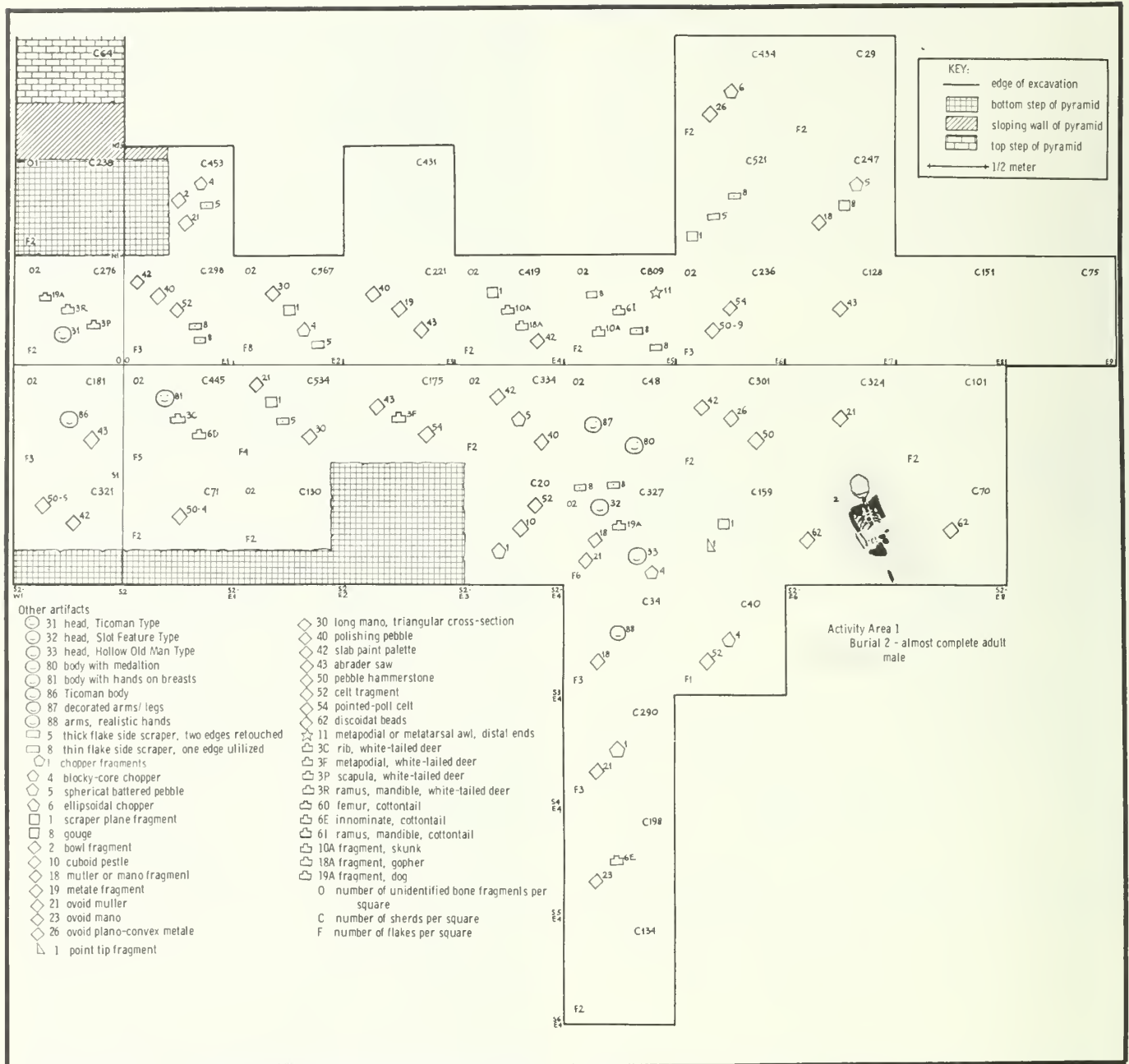


Fig. 88. Features, artifacts, and ecofacts of Zone C, Test 10 of Ts 218 keyed below.

archaeological site and had abundant remains of a Palo Blanco occupation. Unfortunately, it had no floors, architectural features, or other cultural material which would have given us the good contextual data or Palo Blanco stratigraphic data we sought. Thus, the less said about it the better.

Summary of the Cultural Sequence in the Ajalpan Locality

Among the various micro-environments of the Tehuacan Valley we have so far investigated in previous chapters, that of the Valley Center Steppes and Humid

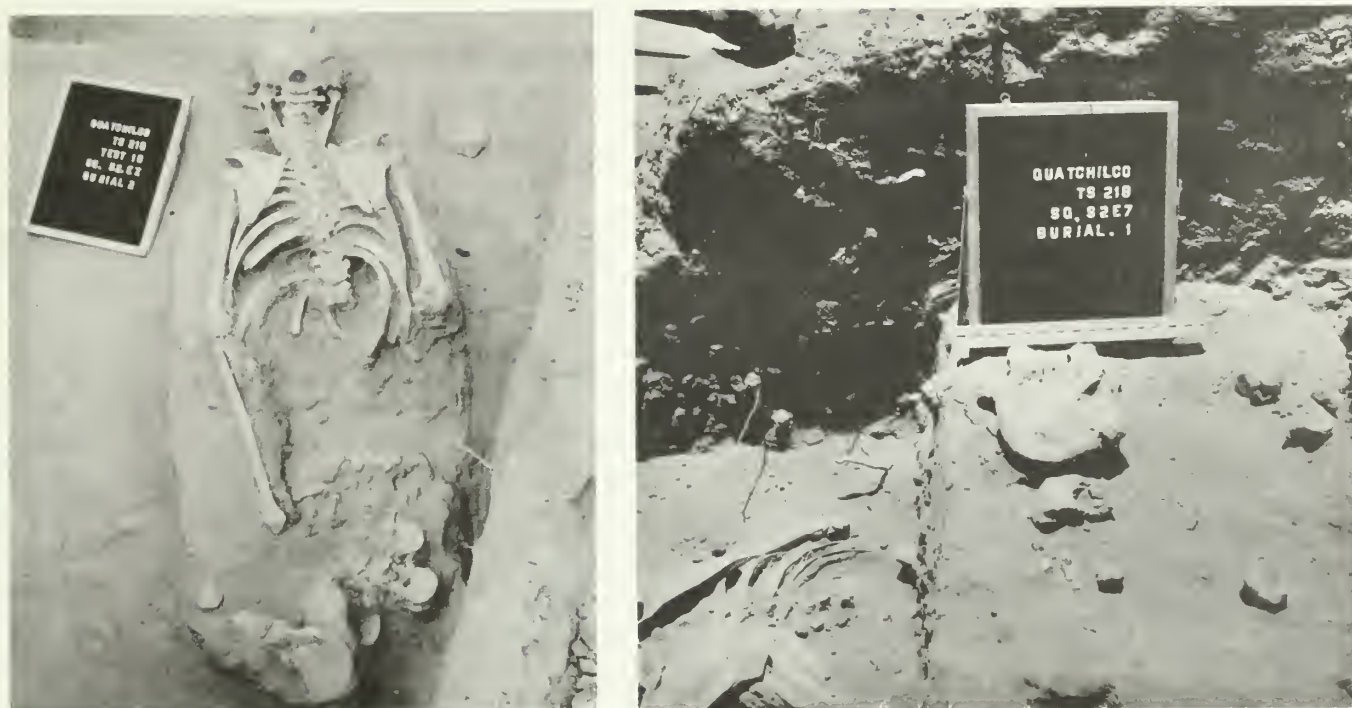


Fig. 89. Burial 2 of Zone C (left) and Burial 1 of Zone B (right), Test 10 of Ts 218.

River Bottoms is unique. We have touched on the poor archaeological recording of excavations here, but, more importantly, we have seen in the excavated sites a shorter cultural sequence and a very different adaptation to these two geographically associated yet ecologically distinct environmental zones.

No Pre-ceramic components were excavated in either of the environs, but survey materials of these earlier periods (discussed in Chapter 7 of this volume) obtained from the clay pit excavations near Ajalpan, Canoas, and Coatepec were suggestive of a rather specialized environmental adaptation in the Humid River Bottoms.

The Lerma points from the commercial clay pit area indicated that Ajuereado occupations occurred in the Humid River Bottoms near the Canoas and Ajalpan excavations. Further, a well-preserved buried Ajuereado component (Ts 500) has been found a few miles north of Ajalpan in the thorn forest Alluvial Slopes environmental zone, along the bank of a branch of the Rio Salado, and Ajuereado surface collections occurred along the Rio Zapotitlan or branches thereof in the barren Travertine Slopes micro-environment.

Ecological studies suggest that sites attributed to later phases in our cultural sequence and outside the Humid River Bottoms Zone were, in Ajuereado times,

within that zone due to the cooler and more humid conditions at the end of the Pleistocene. All of the components were winter hunting camps. We found a great many projectile points, and there were no grinding stones for spring and summer seeds. During the Pleistocene, game was abundant and, as our geological and paleontological studies further show, must have included such extinct animals as horse, antelope, giant jackrabbit, giant turtle, and perhaps mammoth.

Following the Pleistocene, sites of the El Riego Phase (except those from El Riego Oasis) showed that hunting became less important and that the preparation and collection of seeds, as indicated by the number of types of mortars and pestles as well as mullers and milling stones used, became more important to the subsistence of the El Riego peoples. Still, this preoccupation with seeds was not major. El Riego chipped stone artifacts included many projectile points at Ts 204, Ts 367, and Ts 368, and there were few, if any, of the specialized mortars, pestles, mullers, or milling stones. This was also true of some of the El Riego sites in the humid river bottoms of the Rio Zapotitlan. We have interpreted this to mean that the older pattern of winter hunting continued in the Humid River Bottoms Zone where winter game still abounded, even without the larger mammals of the Pleistocene.

Adaptation to this environment during Coxcatlan times was difficult to determine. San Nicolas, Tilapa, Coxcatlan, and Garyito points were recovered from the Ajalpan, Canoas, and Coatepec site areas. A trough metate, an ovoid mano, and three oblong manos occurred at Canoas, but none occurred at Coatepec. Points from Ajalpan all came from a specialized area within that site. This suggests that the same pattern of the winter hunting camp continued in Coxcatlan times. If future investigations prove this to be true, it will be most significant that a subsistence system of seasonal scheduling should have persisted here while elsewhere in the valley Coxcatlan peoples were by this time practicing barranca horticulture of domesticated plants, for certainly the nearby flood plains of the Rio Salado would have been an excellent location for such new subsistence practices.

Abejas projectile points and chipped stone artifacts occurred at Ts 367, Ts 368, and Ts 204; and a collection from a special area of Ts 204 (which probably should have been called Ts 204F) hint that a new subsistence adaptation to the Humid River Bottoms had developed. This site was found by our night watchmen at the Ajalpan excavations, along the eastern edge of the Rio Salado about half way between it and Canoas. Not until they had collected their bounty at a peso a point for their bag of goodies did they take us to the place from whence they came, a small pile of ecofacts and artifacts left by the clay pit diggers. There were some Venta Salada sherds and artifacts, but the bulk of the pile was flint chips and cores, Abejas chipped and ground stone artifacts, and slabs or flat river boulders. We believe the clay pitters had dug out an Abejas component, perhaps a slab-lined pit house hamlet, whose people had probably practiced barranca agriculture or horticulture. If future investigations validate this hypothesis we will then have the beginnings of the subsistence adaptative pattern well documented in our excavations of Formative components in this micro-environment.

It was in the period of the Ajalpan Phase, roughly from 1500 to 900 B.C., that life in the Humid River

Bottoms stood out in sharp contrast to the rest of the valley. This was the main area where barranca agriculture was practiced and where probably the majority of the population was living, as indicated by survey. In fact, it would seem that any exploitation of any other micro-environment was in the form of forays out from hamlets in the Humid River Bottoms. This zone is the only environment with the Ajalpan cultural system and its distinctive technology, barranca agriculture, rectangular wattle-and-daub houses, hamlet settlement pattern, folk market exchange system, and kin-aggregate social sub-system.

In Santa Maria we see the continuation of this type of barranca agriculture adaptation to the Humid River Bottoms environment. Some irrigation agriculture, a new exploitative technique, may have been practiced as well. A slightly different cultural system developed during Santa Maria. Besides the subsistence changes, there were technical advances, a new ceremonial exchange subsystem, a settlement pattern of hamlets oriented to ceremonial village centers, a rise of cults, and a more complex social system. The Humid River Bottoms, although still of central importance, had by now lost its individual character. Its once distinctive way of life was now practiced in the Valley Center Steppes, the Canyons of the Dissected Alluvial Slopes, the Alluvial Slopes zone, and perhaps elsewhere in the valley.

Following the Santa Maria Phase and during the Palo Blanco Phase, the Humid River Bottoms ceased to be of much importance in the Tehuacan Valley; our excavated materials from this period are limited, to say the least. During Venta Salada, although populations seemed to have once again increased in both the Valley Center Steppes and the Humid River Bottoms, the capitals of city-states were all located elsewhere. Our excavations of these zones during Venta Salada are also extremely limited.

All in all, in the long unique history of the Tehuacan Valley, these two regions had their one moment of glory during the Formative.



CHAPTER 6

Excavations in the Coxcatlan Locality in the Alluvial Slopes

Melvin L. Fowler and Richard S. MacNeish

THE LOCALITY OF Coxcatlan Cave lies within the micro-environment or ecological subdivision that we have called the Alluvial Slopes zone. To the east of the steppes of the valley center and the humid river bottoms, the alluvial slopes of the Sierra Madre rise to elevations of between 1000 and 2500 meters above sea level. To the south, the narrow canyons of the Dissected Alluvial Slopes zone is set apart as a sub-zone within the region. Farther south, at about Los Cues, the alluvial slopes extend well up the flanks of the Sierra Madre, and west of the Rio Salado slope upward into the Mixtec hills to elevations of about 2500 meters. To the north-northwest the alluvial slopes

give way to the travertine slopes of the Zapotitlan Valley and to the south run well into the Cuicatec region.

Sandy, gravelly alluvial soils overlie in part a number of geological formations, for the most part the Cenozoic Huajuapán formation in the northeast, and, in most of the southeast, south, and southwest, the Cenozoic Tehuacan formation.

The gentle slope of the thorn forest in the Coxcatlan locality is liberally dissected by arroyos and such erosional remnants as the mesas and conical hills of the Cerro Colorado de Ajalpan, the Cerro Colorado de Tehuacan, the Cerro Tepetroje, and the Cerro Zina-

catepec, rising up from the sloping areas. The base of these hills often contain rock shelters and caves. On the east side of the valley the amount of rainfall is usually between 500 and 800 millimeters per year; west of the Rio Salado about 400 to 700 millimeters of rain falls yearly. These figures represent the rainfall during two short periods of the year, roughly June and August, characteristically the result of brief but heavy thunder-showers that rapidly turn the normally dusty arroyos into raging torrents of water. For a few brief months, then, the locality takes on a greenish-brown hue. The rest of the year it remains a dry, dusty brown.

Annual temperatures show considerable seasonal variation. The hottest parts of the year are the late spring before the rains come and the warm summer season when there is no cloud cover. Temperatures average between 30° and 48° C. daily. During the dry winter months, the minimum temperature falls somewhere between 1° and 9° C. Rarely is there frost. The daily range of temperature is often extreme. During the brightest days the temperature may rise to 50° C. and may drop as low as 1° to 3° C. at night. Most nights average a pleasant 15° C. On cloudy days that threaten rain, temperatures may fall into the teens. Generally speaking, it is the southern part of the locality at slightly lower elevations that is the warmest.

This dry hot climate and the topography, soils, and geological features all correlate with an equally distinctive vegetational assemblage—typically, a canopy of thorny trees and scrubs interrupted by only occasional patches of grass. The cover is generally densest nearest the arroyos, and the grass patches occur on poorer soils usually some distance from the arroyos.

Pochote, mesquite, and tall legume trees grow alongside many pod-bearing trees such as garabatillo, guaje colorado, and guaje blanco. In some of the damper areas near the arroyos wild trees flourish—chupandilla, cosahuico, and ciruela. In the drier areas, or areas with poorer soils, are many thorny scrubs, for example *Agave*, as well as such cactus as prickly pear, pitahaya, organo, tempixquile, and some tetecho. There is some suggestion that during the Pleistocene the thorny canopy was limited by the more extensive grassland. Some of the arroyos and isolated springs may have had permanently flowing water and some sort of gallery forests.

Whitetail deer, coyote, puma, bobcat, peccary, skunk, fox, and various kinds of rats occur during most seasons; turtles, lizards, iguana, doves, owls, nightjays, and cranes only appear seasonally.

Except for the clays for pottery and the flint, either from pebbles or from the Huajuapán Formation, re-

sources for man were seasonal. In the dry season, animals were scarce (except for occasional deer, rabbits, and rodents) and the only plant foods were *Agave*, *Opuntia*, and tetecho fruits. Late in winter and lasting into spring were pochote flowers, and in the spring mesquite pods and various grass seeds were available for food, as were *Opuntia* and *Agave*. During this period, and on into the wet summer months, most of the animals we have mentioned were still available, as were reptiles, turtles, snakes, racerunner lizards, and iguana. Now amaranth, squash, and, originally, wild corn could have been used for food. Fall was a transitional period. The animals mentioned had disappeared, and most of the seed plants no longer yielded food. However, various fruits such as ciruela, chupandilla, and cosahuico became edible. In summary, then, it was the summer and fall when food was abundant; in the spring man could just manage to eke out a living. Only the winter presented major problems, as the energy expended for food may have just barely equalled the energy obtained from those foods.

Although survey showed this locale to be archaeologically a rich area (a program is now continuing study), sites excavated here in the period from 1961 to 1964 were not numerous. However, what we lacked in quantity was compensated for by the quality of one of our excavations, Coxcatlan Cave (Tc 50). Ts 51 on the terrace in front of Coxcatlan Cave was also excavated, and three tests were made. The test in cave Tc 339 yielded few remains, but the other two in two large Postclassic ruins, Tr 65 and Tr 62 (Coxcatlan Viejo), had and continue to have considerable potential. During our 1960-1964 endeavors the tests made were small, but in 1969 a major program of excavation was commenced by E. Sisson on the latter two sites, so we expect that our meager information presented in this report will eventually be greatly augmented.

The Coxcatlan Rock Shelter

In the southeastern corner of the State of Puebla, near the village of San Rafael and about 7 kilometers southeast of the town of Coxcatlan on the highway to Teotitlan del Camino, an arroyo enters into the central drainage of the Rio Salado. This arroyo, called Arroyo Coxcatlan, provides drainage for the small amount of rainfall on the western slopes of the nearby Cerro Chichiltepec. There is ample evidence that during the rainy season torrents of water flow through the barranca. Near the upper end of the Arroyo Coxcatlan a large overhanging bluff, the Coxcatlan Rock Shelter (97° 08'48" and 18° 12'36") was found at an elevation of about 1,000 meters (Fig. 90). The shelter was



Fig. 91. Coxcatlan Cave, as viewed from the north.

apparently formed by the weathering, largely by wind erosion, of the basic rock which forms the bluff. There was no evidence of water cutting into the hard rock floor, apparently several meters above the floor of the arroyo, before the first occupation. Water-cutting would mean either a very high torrent of water or a level of the arroyo floor much higher than today. The first concept is not probable due to the nature of the area drained by the arroyo. The second proposal is not acceptable due to the fact that another site (Ts 51) was located on the terrace below the rock shelter and its earliest occupation is some eight thousand years old. Until more complete studies are made on the physical and alluvial geology of the region we must reserve further comment.

Whatever the process of formation, the result was a very large rock shelter several meters above the barranca floor and facing the northwest, thus providing almost ideal (cool and dry) conditions for living. The bluff extended to a height of 50 meters above the shelter. The sheltered area was 30 meters in length and 8 meters in width at its maximum depth (Fig. 91). In

the southwest portion of the shelter a "room" was at a higher elevation than the rest of the shelter area. The deposit in the room was shallow and made up largely of loose rock fill, so it apparently was not utilized as an occupation area. The large rock fall in front of this room area may have been related to its formation (Fig. 92).

Excavations were first begun in the shelter by MacNeish during his reconnaissance of the area in 1960. At that time three 1-meter squares were dug in front of the "upper room" and behind the large rock fall. On the basis of these tests it was decided that the rock shelter warranted full-scale excavation.

The extensive excavations started in February 1961 by MacNeish, joined by Fowler, early in March, who continued the excavations into May. Work began again in February 1962 and was carried through to May once again. Further excavations, carried out in 1963 by Fred Johnson and MacNeish, sought answers to some problems that had arisen in the analysis of the faunal materials from the site. During the excavations we were very fortunate to have the assistance of Angel



Fig. 92. Excavation in the west end of Coxcatlan Cave, showing its stratigraphy, with interior room at upper left.

Garcia Cook, Robert Chadwick, Antoinette Nelken-Terner, and Arturo Arbide.

Excavation of the Cave

The site area was staked out in a 1-meter grid with the west-east axis parallel to the long axis of the shelter, and the north-south axis perpendicular to it. The 0-0 point was located roughly in the center of the occupation area. Squares within the grid were recorded in terms of the stake in the lower right-hand (or south-east) corner of the squares as one faced north. An arbitrary datum plane was established above the highest level of the shelter floor. All contours and elevation

data were recorded in terms of depth below this datum plane (Fig. 93).

Other than the test squares dug by MacNeish, the first excavations were trenches put in along the West-3 north-south line and the East-6 north-south line. These were excavated a meter square at a time to determine the total depth of the shelter and to provide a cross-section of the stratigraphy. Once these trenches were completed back to the 0 west-east line of the grid, the technique of excavation was changed. After carefully studying the natural stratigraphy of the two trenches, excavations were begun, moving the walls of the two trenches toward each other. This was done by excavat-

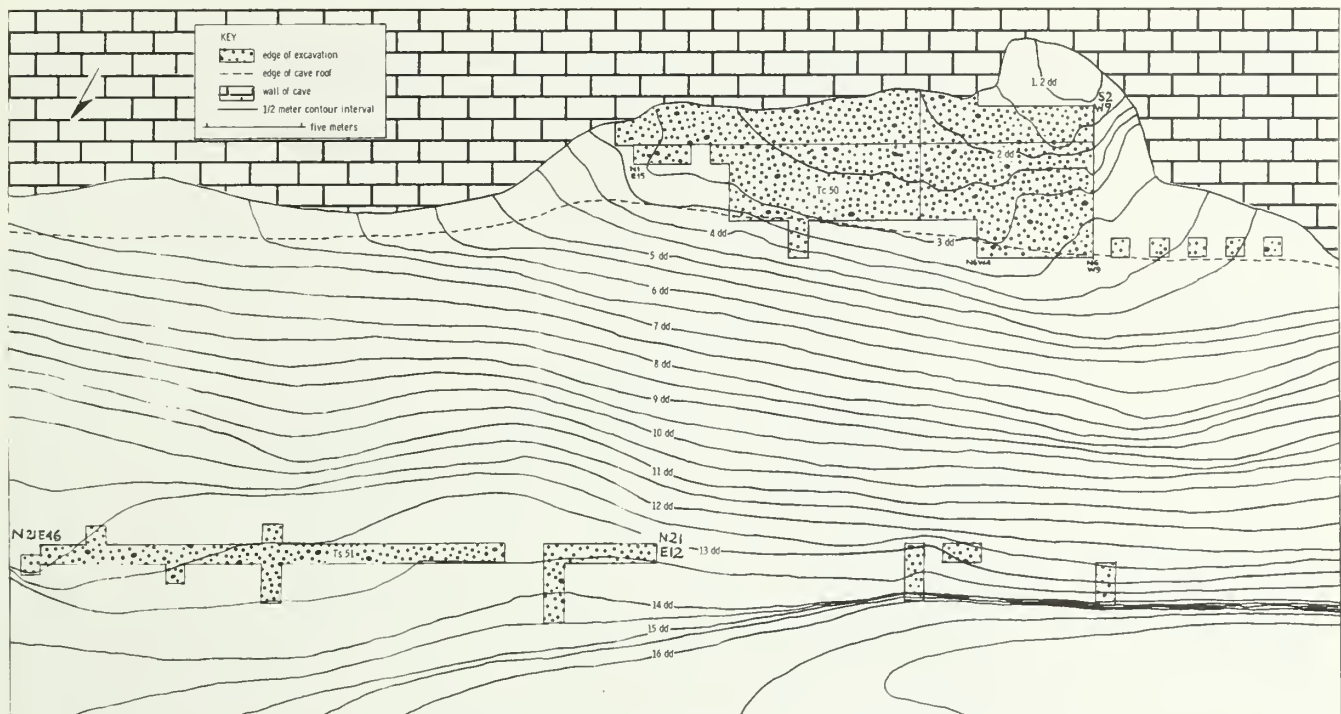


Fig. 93. Contour map of Coxcatlan Cave (Tc 50) and Ts 51.

ing alternating squares in each trench to a depth of about one meter. The stratigraphy was clearly marked on the three walls of the remaining squares, and they were excavated. All of this excavation was done in terms of the natural stratigraphy (see Figs. 94, 95). If a natural stratum was more than twenty centimeters in thickness, it was subdivided into arbitrary levels. After the first line of squares had been excavated to a depth of one meter, excavation was started in alternate squares in a new line of squares and in the bottom half of the first line. In this way the two faces of the north-south trenches were moved progressively toward each other. Careful control was kept on the natural stratigraphy, and it was possible to keep a fairly large number of workmen active at one time.

When a square was excavated, drawings made of the stratigraphic sections thus exposed showed details of the strata, location of intrusive pits, location of rock, and pertinent descriptive data. Thus, all four sides of each square excavated were recorded. We have, therefore, complete profiles of section drawings for each line in the grid.

All of the actual excavation was done by hand, using a trowel as the main tool. The excavated earth was carried in buckets to a screen where all remaining

objects were removed and bagged. In this way, many artifacts were encountered in situ, and all were secured as to the natural stratum from within a single grid square.

Before sealing the bags, the recovered materials were separated into categories, such as maize remains, beans, quids, artifacts of stone, etc., wrapped in aluminum foil and tagged by these categories. In this way the job of processing in the laboratory was facilitated, and a better knowledge of what was being recovered in the field was secured.

After the site area had been excavated to the 0 west-east base line, that is, between W4 and E6 from N4 to 0, the 0 west-east profile was carefully troweled and studied to check on the stratigraphy of the site and the correlations of the strata from the east and west portions. After carefully drawing and photographing this profile, the excavations were continued, using the step-trench technique, to move the 0 line profile back to the rock wall of the shelter. Thus, by the end of the first season, the entire area between the N4 line and the back wall had been excavated from E8 to W4.

At the beginning of the 1962 season, it was decided that the huge rockfall located between W4 and W6 be removed. After several days of extremely hard work,



Fig. 94. Alternate square excavation technique in central portion of Coxcatlan Cave.

excavations were begun. These excavations concentrated on pushing east and west to determine the limits of the rock shelter occupation. Once again the step-trench technique was used. As excavations proceeded west, it became apparent that the intensity of the occupation was decreasing and the depth of the deposit was becoming shallow. Therefore, a series of 1-meter-square pits were excavated along the N6 west-east grid line to see how far the deposit extended.

The east section was excavated as far as the E16 north-south line where the amount of preserved material had decreased, due to the narrow width of the area protected by the overhang. The east area proved

very rewarding in terms of the amount of preserved plant remains, artifacts, and burials.

During the 1962 season, we decided, at the suggestion of Fred Peterson, to test down into the rock floor to make sure we had reached the absolute bottom of the occupation zones. What we had called rock floor turned out to be composed of loose rock fill, which was very thin at about the W1 line but which increased in thickness as we progressed toward the east and north. Slight lenses of carbon materials, a simple scraper, and animal bones suggested to us that the site had been occupied while this loose rock was accumulating.

The brief period of excavation during the 1963 sea-



Fig. 95. Coxcatlan digging technique and our interested workers.

son was directed toward recovering a larger sample of materials from this loose rock fill area and working out details of the stratigraphy. The 1963 work was largely under the direction of Fred Johnson who kindly consented to extend his stay in Tehuacan to conduct this phase of the project.

Stratigraphy of the Cave

The physical stratigraphy of the Coxcatlan site was very clear; markings between zones of occupation were distinct throughout most of the stratigraphic section (Fig. 98). For the most part, they seemed to have been built up by the accumulation of such debris as plant

remains, broken artifacts, feces, animal bones, and other litter of human living. When the specific occupation ceased, a layer of undisturbed debris was left. The buildup of the occupation debris was labeled as zones, and the line of relatively undisturbed organic material capping and terminating the growth of each zone was labeled as floors. Sometimes there was a distinct floor within a zone, and it was numbered as a separate occupation floor. The zones are numbered from the top down by Roman numerals. The floors are numbered in sequence as they probably were occupied. Thus, Floor 1 is at the bottom of the shelter deposit above the loose rock fill.



Fig. 96. Excavation in the east end of Coxcatlan Cave showing its stratigraphy in the area of E10.



Fig. 97. The east-west S1 profile of Coxcatlan Cave in the area of E7, with initial lettered designation of strata.

The stratigraphy became more discernible as one moved in under the bluff and was most clearly seen in the 4 to 5 meters closest to the wall of the rock shelter. In the sections further out from the bluff, the stratigraphy became less discernible, due to at least two factors.

One factor was that the overhanging bluff protected the deposits under it from moisture. Those areas of the site behind this line were well preserved but those in front of it were not. Apparently moisture, from both direct rainfall and dripping from the overhanging bluff, penetrated into the deposits, bringing about the decay of the organic materials and obliterating the distinct stratigraphic markings. This was very apparent in the N-S profiles (Fig. 96). At the point of the limit of the overhang, there was, in these sections, a distinct boundary of well-marked stratigraphy on the one side and no clear stratigraphy on the other. Furthermore, as the moisture filtered down through the soil, it apparently

spread out, so that there was a diagonal line of zone obliteration, and, as one dug deeper into the site, the line of demarcation between clear stratigraphy and obliterated stratigraphy moved in toward the bluff (see Fig. 96). This diagonal line was clearly marked, as salt crystals had been deposited, making a rather hard zone of demarcation. On the profiles (Fig. 98) these are labeled as "Area of Crystallization." This area or band became thicker as one progressed deeper into the deposits, so that at the point of contact with the rock floor of the shelter it made a large deposit cementing together the soils, bones, seeds, artifacts, etc., of the remains of human habitation.

A second factor obliterating the stratigraphy was the bleaching process of the sun on the deposits. Those portions of the site which were outside the shadow of the bluff for half of the day or more were bleached to a very light gray color. This was particularly observ-

able in the western N-S profiles (see Figs. 92 and 96). Therefore, it is probable that all of the stratigraphic zones originally were of greater extent than we have been able to observe. Most of them extended only to the N3 W-E line in our observations. Beyond this, they were obliterated by the factors discussed above.

Three major divisions in the gross stratigraphy of the site group the several zones into three series. A break between Zones XXV and XXIV represents a major discontinuity in the physical factors involved in the buildup of the deposits. The other break between Zones VIII and VII is not so marked but perhaps represents a difference in the nature of the occupation.

The earliest of these three major zone groups, which we call Series C, was the loose rock fill in the bottom portion of the eastern sections. It was made up almost entirely of rather small fragments of rock, ranging from 1 to 3 inches in diameter, and some large slabs 2 to 3 meters in diameter and 50 cm. thick, these latter in the eastern section of the fill. Interspersed in this loose rock fill were fragments of animal bones, a few artifacts, and some charcoal. Complicating the picture were the rat burrows in the loose rock. In the loose rock fill we observed convoluted lines of organic stain which we have indicated by the dashed lines in the profile drawing (Fig. 98). These lines, which gave the appearance of being occupation floors, were mainly between 0 and E5; further to the east they became even more tortuous or disappeared altogether. The zones in this bottom loose rock fill were numbered XXV, XXVI, XXVII, and XXVIII.

It was obvious that this loose rock fill was largely the result of small flakes of rock falling from the shelter roof above. It is tempting to suggest that this was built up during a period when the climate was more damp than at present and that the possibility of freezing and thawing existed. The seepage of moisture into the many crevices in the bluff wall and its expansion upon freezing might have resulted in the accumulation of such a fill.

Another similar explanation of this deposition is that moisture penetrating into the rock would have dissolved the cementing material, allowing for the dropping off of small pieces of the bluff wall. Each of these explanations proposes a period of climate more moist than the present.

The zones above the loose rock fill were the result of different phenomena, and were made up of large rock-falls, ash, charcoal, artifacts, plant remains, and so forth. They appear to have been largely the result of human activity, although wind-blown dust, some soil falling off the top of the bluff, and animal activity

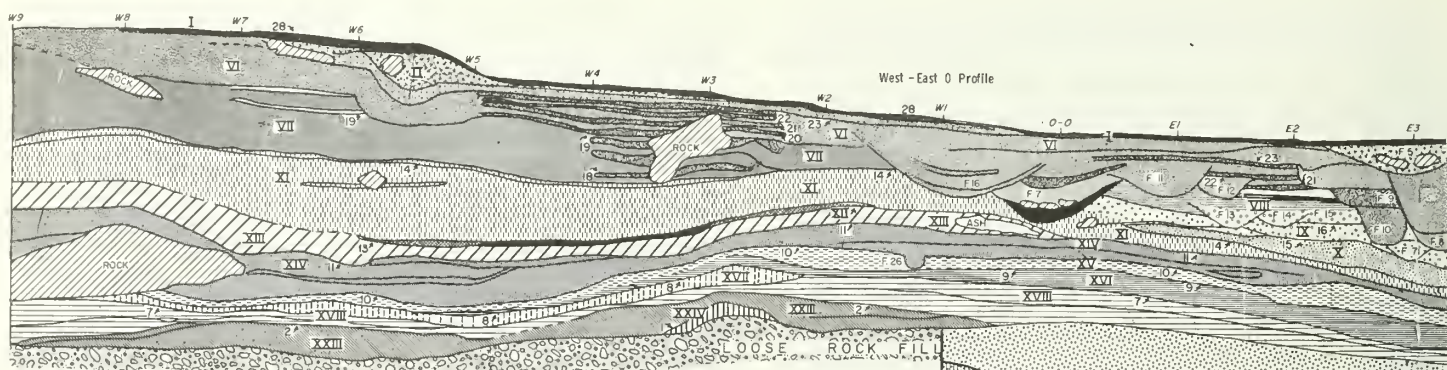
probably contributed. These upper zones are subdivided into two groups. Series A (Zones VII to I) is made up largely of preserved plant remains of many different kinds. Interspersed among these plant remains were large numbers of such artifacts as projectile points and pottery.

The zones below, in Series B (XXIV to VIII), are largely composed of ash capped with thin floors of organic material. These lower zones made up only about one-half of the total profile above the loose rock fill, although there were three times as many zones in the bottom group as in the top. The difference between these groups of zones is readily apparent in the photographs (Figs. 92, 96, 97).

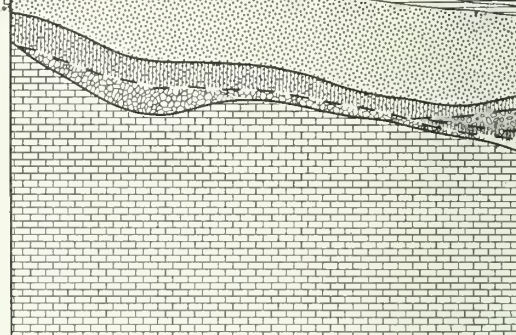
An explanation of these differences is the fact that this represents a true discontinuity in the occupation of the site, and that the occupation of the upper group (A) of zones was different in nature than that of the lower group (B) of zones. As will be discussed in detail later in this report, the apparent disconformity between the two zones VIII and VII is at that point in time when there was a break in the cultural sequence at this site and a gap in the cultural continuity. Zone VII is the first ceramic zone at Coxcatlan Rock Shelter, but it is already of the Santa Maria Phase. The Purron and Ajalpan Phases are missing from the sequence.

The ash zones below Zone VII, in Series B, were probably originally preserved vegetal remains similar to the upper zones. These have been burned out. This probably resulted from the various fire pits built at the site. A fire in the cooking pit would probably have ignited the vegetal remains in the surrounding zones. There were several examples of this in the upper zones. In these cases one could observe a large fire pit with lenses of ash extending out from it in the various zones below the floor where the pit had its origin. The fact that the upper zones (Series A) were not as completely burned out as the lower ones (Series B) is, again, probably a result of the different nature of the occupation above Zone VIII (Fig. 98).

While these three series represent three large, distinct, sequential periods of deposition, they bear little direct relationship to actual periods of cultural occupation of the cave itself. The subdivisions of the series, that is, the zones, are, however, connected with cultural periods. In our chronological studies, the zones were initially treated as actual components, if not occupations. Their exact sequence was at first rather difficult to discern, as we had dug the cave in two different sections, an eastern and a western trench, and named the zones in each by a different designation (the eastern zones were lettered A to T and the western ones

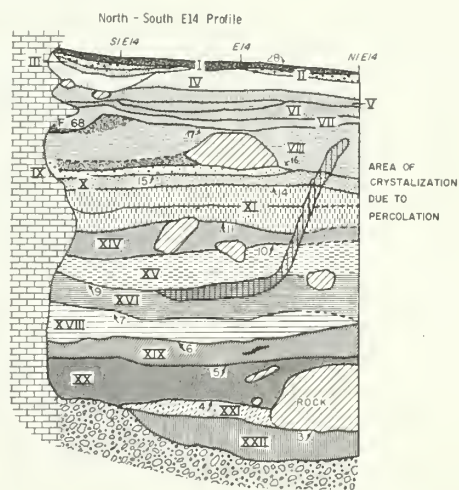
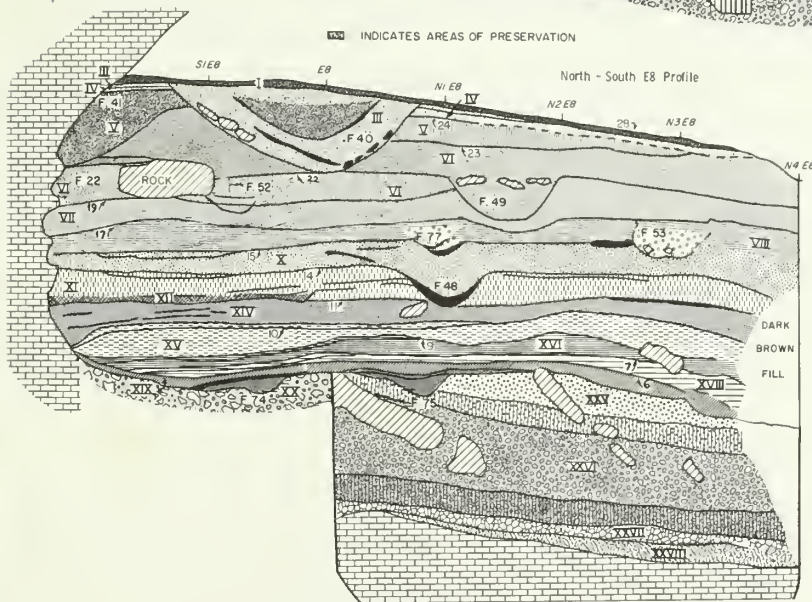
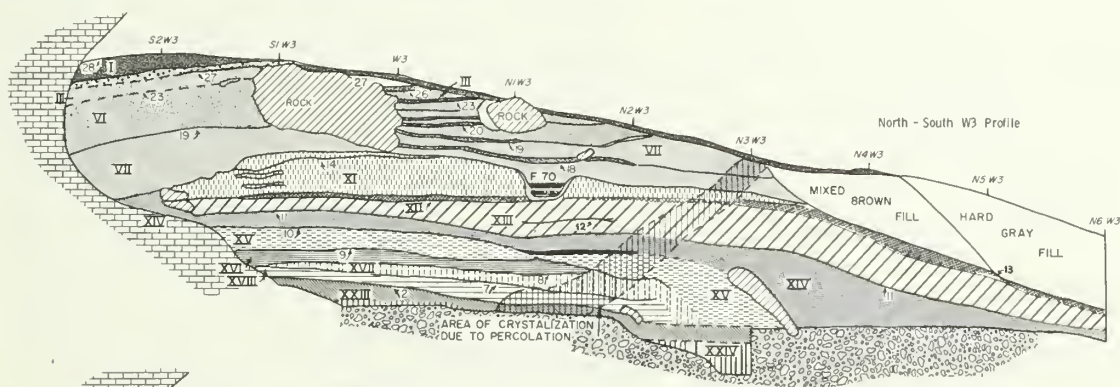
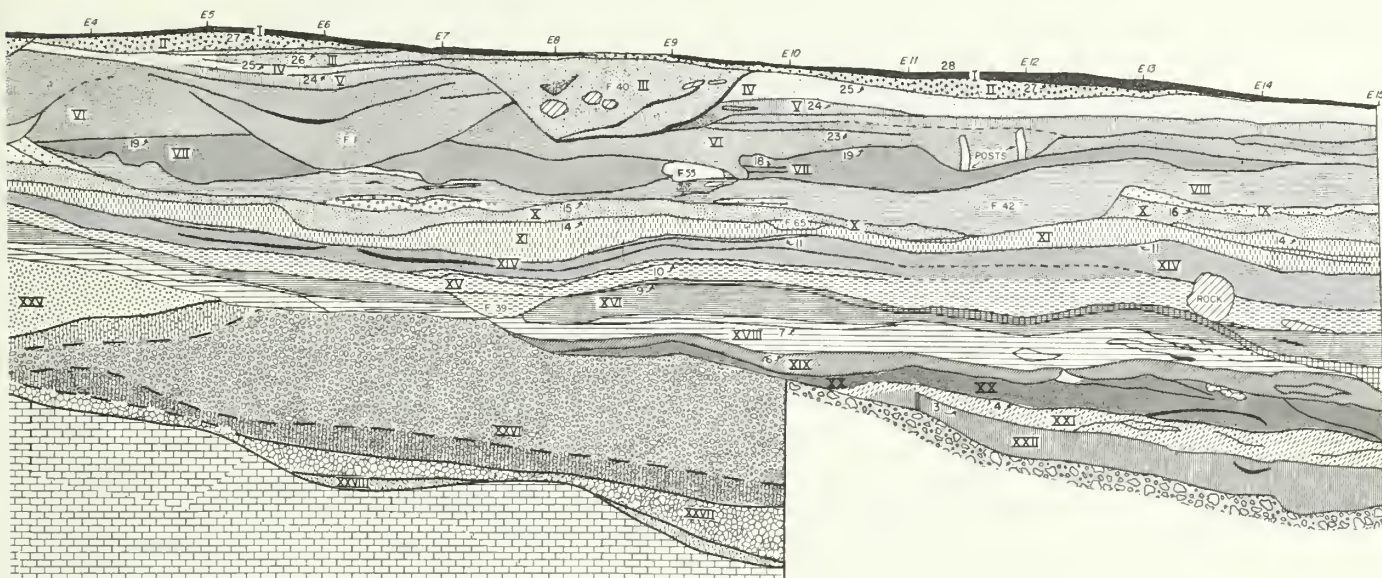


KEY	
	Zone I, Floor 28 - goat dung Occupation 42 Venla Salada Phase 1300-1500 A. O.
	Zone II, Floor 27 - white ash and charcoal Occupations 40-41 Venla Salada Phase 1022-1178 A. O.
	Zone III, Floor 26 - dark yellow and black soils Occupation 39 Venla Salada Phase 790-1010 A. O.
	Zone IV, Floor 25 - ashy soil Occupation 38 Palo Blanco Phase 175-475 A. O.
	Zone V, Floor 24 - yellow, gray and dark black soils Occupation 37 Palo Blanco Phase 91-283 A. O.
	Zone VI, Floors 20-23 - black soil Occupations 32-36 Palo Blanco Phase 195-280 A. D.
	Zone VII, Floors 18-19 - dark gray ash and yellow soil Occupations 29-31 Santa Maria Phase 100-450 B. C.
	Zone VIII, Floor 17 - gray ash and dark brown soil Occupations 27-28 Abejas Phase 2870-3200 B. C.
	Zone IX, Floor 16 - gray ash Occupation 26 Abejas Phase 3071-3295 B. C.
	Zone X, Floor 15 - pink-gray ash Occupation 25 Abejas Phase 3100-3300 B. C.
	Zone XI, Floor 14 - gray-brown and gray-red soils Occupation 24 Coxcatlan Phase 4025-4217 B. C.
	Zone XII, Floor 13 - white-gray ash and brown soils Occupation 23 Coxcatlan Phase 4300-4700 B. C.
	Zone XIII, Floor 12 - gray ash Occupation 22 Coxcatlan Phase 5250-4700 B. C.
	Zone XIV, Floor 11 - dark brown soil Occupations 20-21 El Riego Phase 4800-5300 B. C.
	Zone XV, Floor 10 - gray brown and yellow soils Occupations 18-19 El Riego Phase 4900-5400 B. C.
	Zone XVI, Floor 9 - gray ash Occupations 16-17 El Riego Phase 5430-5800 B. C.
	Zone XVII, Floor 8 - dark brown ash Occupation 15 El Riego Phase 5700-6000 B. C.
	Zone XVIII, Floor 7 - gray brown refuse Occupations 13-14 El Riego Phase 5900-6600 B. C.
	Zone XIX, Floor 6 - yellow rock dust and ash Occupation 12 El Riego Phase 6000-6400 B. C.
	Zone XX, Floor 5 - gray rock dust and yellowish ash Occupation 11 El Riego Phase 6050-6450 B. C.
	Zone XXI, Floor 4 - brownish-gray sand and ash Occupation 10 El Riego Phase 6100-6500 B. C.
	Zone XXII, Floor 3 - yellow sandy soil Occupation 9 El Riego Phase 6225-6725 B. C.
	Zone XXIII, Floor 2 - dark gray soil Occupations 7-8 Ajuereado Phase 6700-7300 B. C.
	Zone XXIV, Floor 1 - gray and black soils Occupations 5-6 Ajuereado Phase 6800-7800 B. C.
	Zone XXV - flakes of rock and sand Occupation 4? Ajuereado Phase 7600-8600 B. C.
	Zone XXVI - flakes of rock and sand Occupation 3? possibly Ajuereado Phase 7600-9000 B. C.
	Zone XXVII - flakes of rock and sand Occupation 2? possibly Ajuereado Phase 8000-10,000 B. C.
	Zone XXVIII - flakes of rock and sand Occupation 1? possibly Ajuereado Phase ca. 10,000 B. C.



F.	Feature number
VIII	Zone number
8	Floor number
	Concentration of vegetal remains
	Concentration of charcoal
	Ash
	Loose rock fill
	Rock of cave
	Rockfall
	Area of crystallization due to percolation
	one meter distance

Fig. 98. West-east 0 profile (top) and south-north W3, E8, and E14 profiles (lower right) of Coxcatlan Cave.



were numbered 1 to 20); however, by connecting the two trenches we were able to correlate the two sets of zones, and we renamed them with Roman numerals I to XXVIII. By the time this was done, some artifact analysis had been undertaken, so it was possible to classify each of the zones as one or more periods of occupation within a sequence of cultural phases. Zones XXVIII through XXIII were very similar and were classified as components of the Ajuereado Phase, Zone XXII through XIV were of the El Riego Phase, Zones XIII, XII, and XI were of the Coxcatlan Phase, Zones X, IX, and VIII were of the Abejas Phase, Zone VII was of the Santa Maria Phase, Zones VI, V, and IV were of the Palo Blanco Phase, and Zones III, II, and I were of the Venta Salada Phase. While the zones were excellent in typological analysis and in giving us sequences of types and cultural phases, we were well aware, even as we dug them, that they represented sequential blocks of time and not discrete occupations. Some zones were capped by distinct charcoal or vegetal layers that seemed to represent definite floors, while others (Zones XXVIII to XXV) were not. Further, some zones, such as VI and VII, had a series of pits coming down from different elevations and floors within as well as on top of them (see Fig. 98). Thus, as we dug the site, we numbered these floors 1 to 28 and bagged material accordingly. We hoped we were defining 28 sequential discrete periods, which overlay the four early zones with evidence only of some sort of less well-defined occupations in them.

This was the status of the cultural stratigraphy when we began our analysis of the individual floors and the four lower zones to determine the activity areas and ipso facto the activities of each of the, at this time 32, occupations. Such a contextual study required that we examine the artifacts and debitage to determine not only the methods of manufacture of the artifacts but also their use; furthermore, it required that we study the associated ecofacts, including those indicating seasonality, as well as the various kinds of contracted features. The latter part of this study led to some surprises, for we discovered that some activity areas on the floors, which we had assumed from their physical context represented single occupations, were, in fact, of different seasons and therefore represented different occupations of that floor. Here were the real definitions of the occupations or the components. So once again we divided the floors into the occupations that occurred on them, giving us a total of at least 42 occupations of Coxcatlan Cave (Table 11). Of course there may have been more which we could not define, but

we believe we have done a somewhat better job of defining the actual discrete occupations and components at this site than is usually accomplished in archaeological analysis.

In summary, then, there were three general stratigraphic series (A, B, and C), which had a number of zones (I-XXVIII) within them, most of which (all but four) contained a floor or floors (28 in all), which contained one or more occupations (42 in all). This basic stratigraphic data can be seen in outline in Table 11, which presents the sequence in the Coxcatlan Rock Shelter.

Features of the Occupations

Associated with the stratigraphic zones and occupations were a number of features that supplemented the artifactual and ecofactual information. These features varied from small cache pits containing only a few seeds to large roasting pits several meters in diameter. It is perhaps significant that, out of 77 features of the 42 occupations in this cave, and 10 were possibly of the winter, none (with the exception of one fire pit) were constructed in that dire dry season. Thus, it would seem that two activities *not* engaged in in the lean winter season were storage and roasting, nor was there any other separate winter activity that would have resulted in any of the kinds of features listed below. This rather unique set of winter conditions (that is, the lack of features) further justifies our separating the floors into discrete seasonal occupations. These features are numbered and will be described in detail in the sections dealing with the occupation or occupations of each living floor. It seems worthwhile, however, to mention them here as well. We have divided them into the following categories:

1. *Roasting pits* containing ash, charcoal, and fire-cracked rocks usually had several layers as evidence of having had a series of fires built in them. These large pits were obviously used for roasting large animals or maguey leaves. They are associated only with the ceramic zones.
2. *Fire pits* were small basin-shaped pits containing charcoal, ash, and burned rock. They gave the appearance of having been used for heating and as cooking fires. Twenty features of this type were found in zones ranging from VI to XIX.
3. *Charcoal Areas* were in many of the zones. On the floors were lenses and patches of charcoal which probably represented locations where fires were built directly on the floor rather than in a pit. Only four of

T A B L E 11
Sequence in the Coxcatlan Rock Shelter (Tc 50)

Venta Salada Phase

SERIES A

Summer-fall Microband Occupation 42, total area of Floor 28 on Zone I, 1300–1500 A.D.
Spring-summer Microband Occupation 41, Area B of Floor 27 on Zone II, 1022–1178 A.D.
Summer-fall Microband Occupation 40, Area A of Floor 27 on Zone II, 1000–1178 A.D.
Summer-fall Microband Occupation 39, Areas A and B of Floor 26 on Zone III, 790–1010 A.D.

Palo Blanco Phase

Summer-fall Microband Occupation 38, total area of Floor 25 on Zone IV, 175–475 A.D.
Fall Microband Occupation 37, Areas A and B of Floor 24 on Zone V, 91–283 A.D.
Summer-fall Microband Occupation 36, Areas A and B of Floor 23 on Zone VI, 150 B.C.–280 A.D.
Fall Microband Occupation 35, Area A of Floor 22 in Zone VI, 80–280 A.D.
Spring-summer Microband Occupation 34, Area A of Floor 21 in Zone VI, 50–280 A.D.
Fall Microband Occupation 33, Areas B and C of Floor 20 in Zone VI, 100 B.C.–280 A.D.
Spring-summer Microband Occupation 32, Area A1 of Floor 20 in Zone VI, 195 B.C.–205 A.D.

Santa Maria Phase

Spring-fall Microband Occupation 31, Area C of Floor 19 on Zone VII, 300–100 B.C.
Winter-spring Microband Occupation 30, Area B of Floor 18 or 19, Zone VII, 400–100 B.C.
Summer-fall Microband Occupation 29, Area A of Floor 18 in Zone VII, 450–150 B.C.

Abejas Phase

SERIES B

Fall-spring Macroband Occupation 28, Areas B–D of Floor 17 on Zone VIII, 3150–2870 B.C.
Winter Microband Occupation 27, Area A of Floor 17 on Zone VIII, 3200–2870 B.C.
Winter-fall Macroband Occupation 26, Areas A–C of Floor 16 on Zone IX, 3295–3071 B.C.
All-year Microband Occupation 25, Areas A–D of Floor 15 on Zone X, 3300–3100 B.C.

Coxcatlan Phase

Spring-winter Macroband Occupation 24, Areas A–F of Floor 14 on Zone XI, 4217–4025 B.C.
Spring-fall Microband Occupation 23, Areas A–D of Floor 13 on Zone XII, 4700–4300 B.C.
Summer-winter Macroband Occupation 22, Areas A–E of Floor 12 on Zone XIII, 5250–4700 B.C.

El Riego Phase

Spring-fall Macroband Occupation 21, Areas E–J of Floor 11 on Zone XIV, 5200–4800 B.C.
Dry-season Microband Occupation 20, Areas A–D in Lower Zone XIV, 5300–4800 B.C.
Spring-fall Macroband Occupation 19, Areas A–C, E–I of Floor 10 on Zone XV, 5300–4900 B.C.
Winter Microband Occupation 18, Area D of Floor 10 on Zone XV, 5400–4900 B.C.
Summer-fall Microband Occupation 17, Areas H and I of Floor 9 on Zone XVI, 5720–5430 B.C.
Fall-winter Macroband Occupation 16, Areas A–G of Floor 9 on Zone XVI, 5800–5430 B.C.
Fall Microband Occupation 15, Areas A–C of Floor 8 on Zone XVII, 6000–5700 B.C.
Wet-season Microband Occupation 14, Areas B, C, D, E and G of Floor 7 on Zone XVIII, 6500–5900 B.C.
Dry-season Microband Occupation 13, Areas A and F of Floor 7 on Zone XVIII, 6600–5900 B.C.
Wet-season Microband Occupation 12, Areas A–E of Floor 6 on Zone XIX, 6400–6000 B.C.
Wet-season Microband Occupation 11, Areas A–C of Floor 5 on Zone XX, 6450–6050 B.C.
Wet-season Microband Occupation 10, total area of Floor 4 on Zone XXI, 6500–6100 B.C.
Spring-summer Microband Occupation 32, Area A1 of Floor 20 in Zone VI, 195 B.C.–205 A.D.

Ajuereado Phase

Spring Microband Occupation 8, Area C of Floor 2 on Zone XXIII, 7200–6700 B.C.
Winter Microband Occupation 7, Areas A and B of Floor 2 on Zone XXIII, 7300–6700 B.C.
Summer or Fall Microband Occupation 6, Areas A and C of Floor 1 on Zone XXIV, 7600–6800 B.C.
Winter or Spring Microband Occupation 5, Area B of Floor 1 on Zone XXIV, 7800–6800 B.C.

SERIES C

Possible Wet-season Microband Occupation 4, total area of Zone XXV, 8600–7600 B.C.
Possible Spring Microband Occupation 3, total area of Zone XXVI, 9000–7600 B.C.
Possible Wet-season Microband Occupation 2, total area of Zone XXVII, 10,000–8000 B.C.
Possible Wet-season Microband Occupation 1, total area of Zone XXVIII, ca. 10,000 B.C.

these fired areas, one in Zone IX, two in Zone XIII, and one in Zone XVIII, were large enough to be labeled as features, but several of a more restricted nature were observed in the profiles.

4. *Cache pits* in various localities in the site were small basin- and bell-shaped pits filled with plant remains, usually seeds, and nothing else. These were usually in the lowest levels of the Series B strata, often dug into the loose rock floor. This type of feature was observed in Zones VII to XVIII.

5. *Storage pits* were differentiated from cache pits largely by size. They were basin-shaped and contained various types of plant remains, but no ash, charcoal, burned rock, or other evidence of having been used for fire. When discovered, some of these were filled with trash; but, due to the way in which they had been constructed, clay-lined for example, and, due to the lack of any indication of fire, it was assumed that they had originally been storage pits. Storage pits were found in all levels below Zone III.

6. *Refuse areas* were often encountered. These were large irregular areas, often depressions, filled with plant remains and other refuse. These areas were usually depressions against the back wall of the rock shelter where the ceiling was too low for other living activities. Depressions in the tops of abandoned pits were also

used as refuse areas, so that some features have been given a dual classification (see Table 12). Seven of these refuse areas were located in the upper seven zones, stratigraphic Series A of the site, and one possible example was in Zone XV. This may have implications as to the preference of the occupants during those times, or it may reflect the fact that the contours of the shelter itself made living impossible back under the low ceiling. Certainly the earlier peoples dumped refuse out on the talus slopes, but, due to leaching and bleaching, these areas were not clearly definable as refuse areas.

7. *Burial pits* were found at the east end of the rock shelter in Zones VI and XIV. These 4 pits varied in nature and content and will be described in detail when we discuss the occupation of the floors.

8. Two *Special Features* are listed in Table 12. In conjunction with Burial Pit 61, a basin-shaped pit containing several wooden stakes was found. The function of this special feature (No. 66) is unknown. It will be described below in conjunction with the burial pit related to it. In Zone XXIII, Square W3, another special feature of associated grinding stones was found. This was Feature No. 4.

In Table 12 we have listed by their assigned feature number the occurrence of each feature by zone and occupation.

TABLE 12
Features of the Occupations in the Coxcatlan Rock Shelter
(Numbers are the Feature Numbers and do not indicate quantity.)

	Special Features	Burial Pits	Refuse Areas	Storage Pits	Cache Pits	Charcoal Areas	Fire Pits	Roasting Pits
Zone II								
Spring-summer Occupation 41 of Activity Area B, Floor 27								5
Zone III								
Summer-fall Occupation 39 of Activity Area A, Floor 26			21					40
Zone IV								
Summer-fall Occupation 38 of Floor 25				9,56				
Zone V								
Fall Occupation 37 of Activity Area A, Floor 24			41	19,9,56				
Zone VI								
Summer-fall Occupation 36 of Activity Areas A, B, Floor 23							11	3,1
Fall Occupation 35 of Activity Area A, Floor 22								16

(Table 12 continued)

	Special Features	Burial Pits	Refuse Areas	Storage Pits	Cache Pits	Charcoal Areas	Fire Pits	Roasting Pits
Spring-summer Occupation 34 of Activity Area A, Floor 21				12				16?
Fall Occupation 33 of Activity Areas B, C, Floor 20	66	61	22,59	10,17,20			49?	49?
Zone VII								
Spring-fall Occupation 31 of Activity Area C, Floor 19			47?	47?			58,70,2	
Winter-spring Occupation 30 of Activity Area B, Floor 18/19			7?	6	8		7?,55	
Summer-fall Occupation 29 of Activity Area A, Floor 18/19			68	52,57			55	
Zone VIII								
Fall-spring Occupation 28 of Activity Areas B, C, Floor 17				64			42	
Zone IX								
Winter-fall Occupation 26 of Activity Areas A-C, Floor 16				71,13,14 23,31	44	15	18,53,77	
Zone X								
All-year Occupation 25 of Activity Area C, Floor 15							48	
Zone XI								
Spring-winter Occupation 24 of Activity Areas A-F, Floor 14				24,28,25	29		65,32	
Zone XIII								
Summer-winter Occupation 22 of Activity Areas A-E, Floor 12						54,60	50	
Zone XIV								
Spring-fall Occupation 21 of Activity Areas E-J, Floor 11		69,62,63			26,27		76	
Dry-season Occupation 20 of Activity Areas A-D, Lower Zone							51	
Zone XV								
Spring-fall Occupation 19 of Activity Areas A-C, E-I, Floor 10			43?	34,39	30		72	
Zone XVI								
Fall-winter Occupation 16 of Activity Areas A-G, Floor 9						?	46,33	
Zone XVIII								
Spring-summer Occupation 14 of Activity Areas B-E, G, Floor 7				73	38	4A	45	
Zone XIX								
Wet-season Occupation 12 of Activity Areas A-E, Floor 6				36			37	
Zone XX								
Wet-season Occupation 11 of Activity Areas A-C, Floor 5				74,75				
Zone XXIII								
Spring Occupation 8 of Activity Area C, Floor 2	4			35				
Zone XXIV								
Summer-fall Occupation 6 of Activity Area A, Floor 1					67?	67?		

In the following sections materials from the various stratigraphic layers and sequential occupations will be considered zone by zone. In each zone greatest emphasis will be placed on the various spatially non-random concentrations of artifacts, ecofacts, and features. These concentrations we consider to be activity areas; that is, the artifacts, ecofacts, and features are the results of certain activities occurring in certain locations within the zone or on the floor. These locations were initially plotted by hand; later, for the sake of uniformity, we had the ecofacts and artifacts printed and so located by a Cal. Comp. line plotter. This was done with an appropriate symbol for each class of artifacts or ecofacts and a number for each sequential type within the class. These zones or floors within zones were so plotted, not only in the interest of speed and uniformity, but also in the hope that some statistician of the future might be able to use this data in some sort of, as yet unknown (at least to us), computerized locational analysis.

After the various artifact and ecofact types in each cluster of each zone or floor were determined, they were studied in an attempt to determine the specific kind of activity or activities undertaken in the specific area. Obviously, this was on the assumption that items in non-random distributed clusters not only were related in some manner, but also were probably connected with each other in some specific cultural activities that reflected the behavior of the individual or individuals who had once occupied these locations. Perhaps some sort of computer program could have specified the clusters or items in the clusters better than this eyeballing technique, but no such program was available to us. Basically, our interpretations of the items in these clusters were by ethnographic analogy; for example, a cluster of manos, metates, and corn cobs with cut glumes indicating that the kernels had been removed was considered to be a corn-grinding activity area, for such a cluster of items is similar or analogous to a Mexican Indian kitchen where we have observed grinding corn with like tools. Only in rare cases did we test these ethnographic analogies (perhaps better called ethnographic hypotheses) with experiments; for instance, using the mano and metate or similar tools for grinding corn, and then examining microscopically our excavated specimens for evidence of use, and comparing the specimens with the tools we had used. This would have added much to our interpretations of the activities of the various clusters, and we certainly recommended such a procedure. The artifacts from the excavations are still available for study. Meanwhile, in the following zone descriptions, we have indicated the

activity areas by shading and symbols and have given our interpretation of the activities in the keys accompanying the figures.

Once this was done for each zone, we attempted to relate the activity areas on each floor or zone to each other. Here the seasonal indicators were of great value. We were able to assume that a series of activity areas on the same floor with evidences of the same season were, in all probability, contemporaneous, and were the results of activities of the same group; we were able to assume the contrary as well. This is the basis for our reconstructing the way of life of each occupation in each of the sequential zones in this cave. Obviously, our paleethnographics are incomplete, but we believe we have indicated some of the energy flow, within and between certain activity areas, in what were once ancient cultural systems or sub-systems at specific moments in time, following each other one after another for a 10,000-year period. Perhaps, by glimpsing the activities of the various changing and developing cultural systems, we shall have done more than uncover information about how cultures in the Tehuacan Valley changed; we may even have derived the data that could be the basis for hypotheses about why these cultures changed. We believe this to be a long step in the right direction toward developing a theory of cultural change. With this belief in mind, we shall present our descriptions of some of the reconstructed cultural activities of each occupation, from the earliest Zone XXVIII some 10,000 years ago to the most recent Zone I, about 500 years ago in Coxcatlan Cave.

The Way of Life of Zone XXVIII

Zone XXVIII extended from E2 and N4E2 east to E8 and N4E8 (Fig. 99). It was a very compact zone only a few centimeters thick in the west, although somewhat thicker in the east, overlying what seemed to have been the floor of the cave. The zone was possibly compressed by the weight of rocks and zones above it. Materials of a red and black color suggested that fires had been built in the shelter. Due to the large amount of rock fragments and rockfall and the uneven nature of the deposit, we cannot present any conclusive data on the actual nature of the deposit resulting from the living activities.

The only artifacts recovered from this zone besides the chips were a crude blade fragment and a piece of worked bone in N2E6, and so all we can say is that we did find evidence of man in the zone and that perhaps he did some butchering in the cave.

Further proof of man's presence was the many scraps of bone: 2 from a horse, 6 from an antelope, 119 bones

from 8 Pleistocene rabbits, 9 from a fox, 9 from 3 cottontails, 3 from 2 skunks, 1 from a chipmunk, 27 from as many lizards, 16 from an extinct turtle, 1 from a snake, and 4 from birds. Certainly it looked as if these people were involved in rabbit drives, hunting, trapping, and/or animal collecting. The snake, lizard, and turtle bones suggest a wet-season occupation, if the same seasonality is valid for the Pleistocene.

classified this floor as Ajuereado, although we have little real evidence for doing so. The blade suggests Ajuereado, but it could have been an even earlier complex.

This zone was one of yellow sand and fine flakes of rock from the cave wall, overlaid by a grayish gravelly soil. It was almost a meter thick at the E10 square but pinched out by E3 to the south, as well as between N3 and N4, and extended south to the 0 profile to Zone XXVI increasing in thickness (Fig. 100). (In the field notes Zone XXVII was thought of as part of Zone XXVI and was called Zone XXVIA, with the result that Zone XXVIII was numbered XXVII.)

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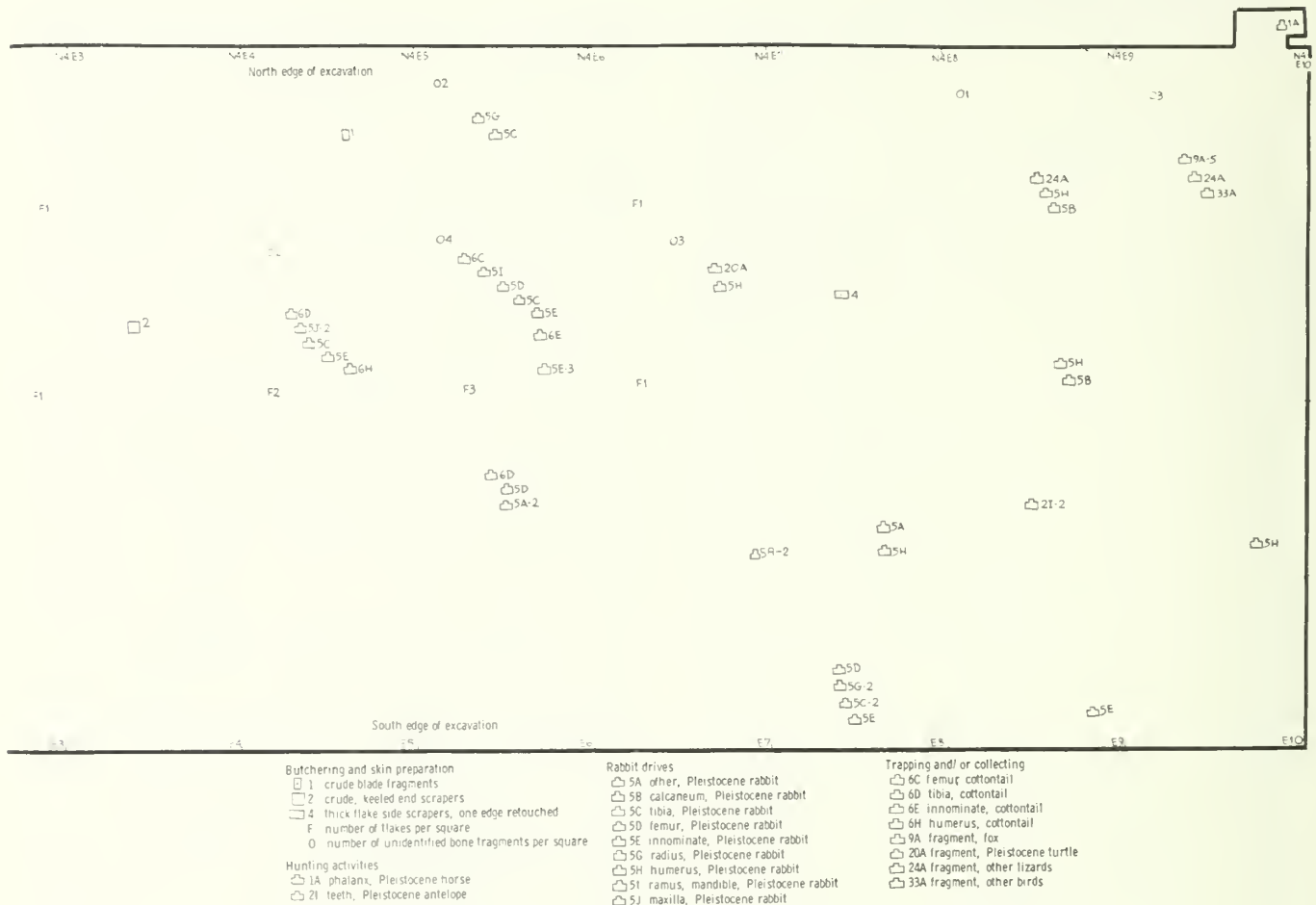


Fig. 100. Artifacts and ecofacts of Zone XXVII of Tc 50, keyed below.

ing were almost non-existent; a crude blade, a keeled end-scraper, 1 thick flake scraper, and 9 chips were found. Bones were fairly numerous; 1 horse phalanx, 2 antelope teeth, 33 Pleistocene rabbit bones, 5 fox bones, 2 lizard bones, 5 cottontail bones, and 1 leg bone of a bird. The evidence suggested rabbit drives, hunting, and trapping or collecting, as well as more grassland vegetation near the cave. The occupation may have occurred during the wet season, as evidenced by the lizard bones.

Although it is questionable whether this occupation (No. 2?) belongs in Ajuereado, two of the artifacts, the keeled end-scraper and crude blade, are diagnostic of that phase. We would guess the stratum was deposited during the Pleistocene some 10 to 12 thousand years ago.

The Way of Life of Zone XXVI

This is a zone of loose whitish-to-yellowish fine flakes of rock. It starts out as a thin layer along the east-west 0 profile from W1 to E10, but to the north it becomes noticeably thicker and distorted. From W1 to about E4 this increasing thickness pinching out about Zone XXVII begins by the N1 profile, while from E4 to E13 this increasing thickness does not become noticeable until the N3 line (Fig. 101).

Eight flint chips and a keeled end-scraper came from N1E1. There was also a palm leaf, 2 fragments of grass, and a mesquite seed. There were many bones: 327 rabbit, 4 horse, 29 antelope, 26 fox, 6 skunk, 4 ringtailed cat, a rock and a prairie squirrel, 33 giant turtle shells, 90 lizard, 1 coyote, and 6 from birds. Interestingly enough, many badly smashed rabbit skulls

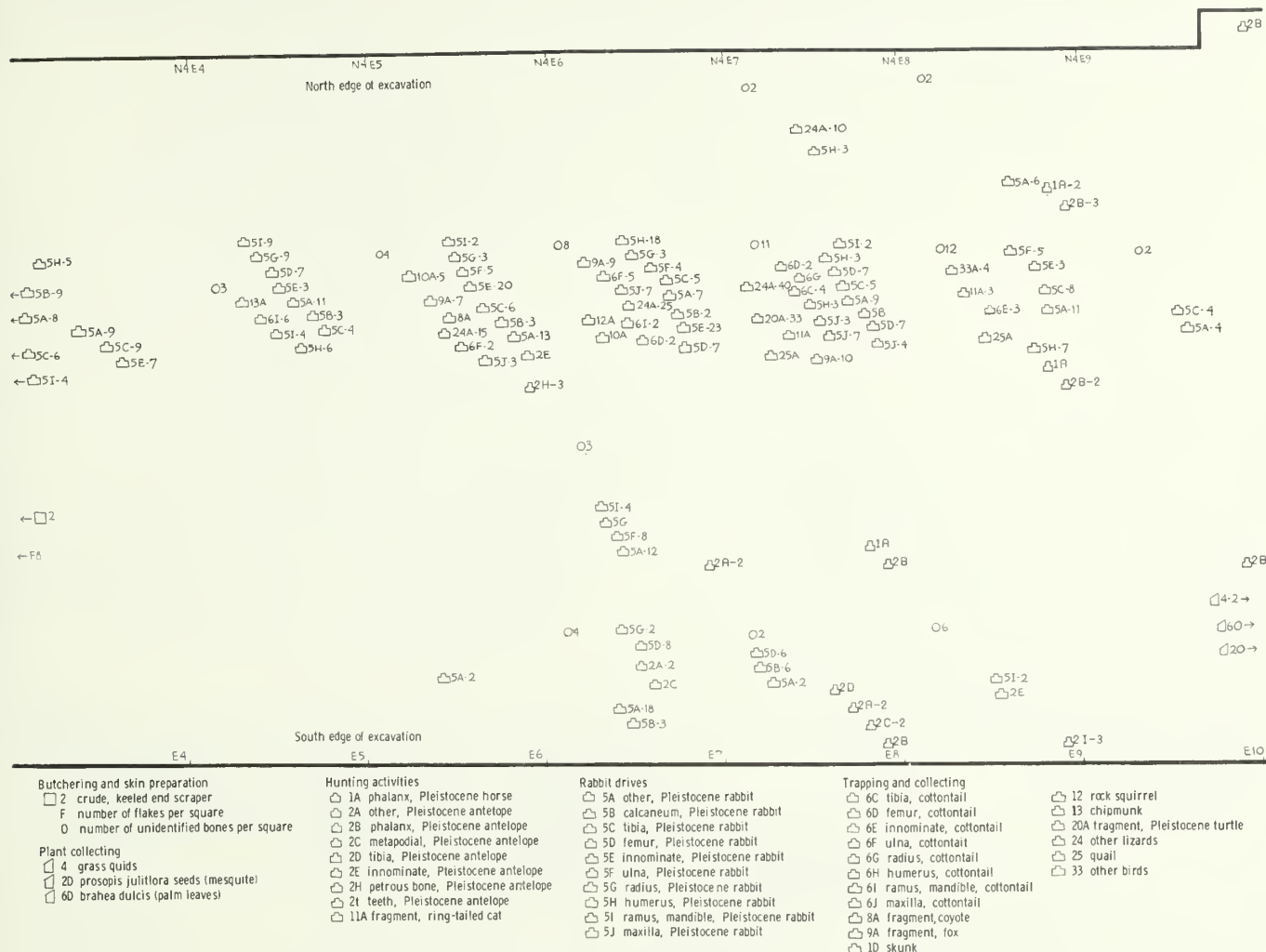


Fig. 101. Artifacts and ecofacts of Zone XXVI of Tc 50, keyed below.

gave good proof of animal drives; the other mammals could have been hunted or trapped. Butchering was undoubtedly done, and the plants suggested spring collecting.

Again, the assignment of this zone to Ajuereado is shaky and dating it is difficult, other than to say that this occupation (No. 3?) occurred before 7600 B.C.

The Way of Life of Zone XXV

Zone XXV was the topmost layer of the lower Series C of loose laminated rock. It varied from a yellowish to a reddish color, the latter perhaps the result of burning. This zone marked the end of the series of zones lacking well-defined floors, and was the last zone to have extinct animals in it. Thus, it probably marked

the end of the Pleistocene and should date just before about 7600 B.C., radiocarbon time (Fig. 102).

Like the previous zones, it was small in size and contained lizard and turtle bones that suggested a wet-season microband encampment. The antelope bones, extinct rabbit bones, and small animal bones (cottontails, coyote, fox, rock squirrel, chipmunk, turtle, and lizard) seemed to indicate that this occupation was task oriented. The main tasks were hunting, rabbit drives, trapping, and/or collecting. It should be added that restudy of these osteological remains gives counts rather different from those in Vol. 1, Table 16.

In this zone, for the first time, there were enough artifacts to indicate other activities that may have been interconnected with this hunting, trapping, and col-

lecting subsistence complex. The crude blades, chopper, and thick side-scrapers, in association with the animal bones, which included many smashed and unidentified, suggested a related activity, butchering, and the keeled end-scrapers indicated that skin preparation may have occupied a like position. The burin and spokeshave hint that woodworking and perhaps bone-working were also related activities, while the cores and chips show that flint knapping must also be included in this complex. One of the tiny chips from N2E8 was bifacially chipped and might have been a base of a Lerma point, further evidence of dart ambush hunting; the piece was so small that even we did not classify it as a point or plot it as such.

flow in a negative feedback system, between hunting, trapping, collecting, butchering, skin preparation, bone- and/or wood-working and flint-knapping activities. Further, there is evidence that this cultural sub-system persisted throughout the rest of the sequence, even though other sub-systems, interrelated with other subsistence activities, came into being. Further, this task-oriented sub-system later often came to occupy their energies in a specific period of the year--the dire dry season. However, as the meager evidence from Ajuereado has indicated, at this time the sub-system had no such specialized ecological relationship and may have commonly occurred throughout the year.

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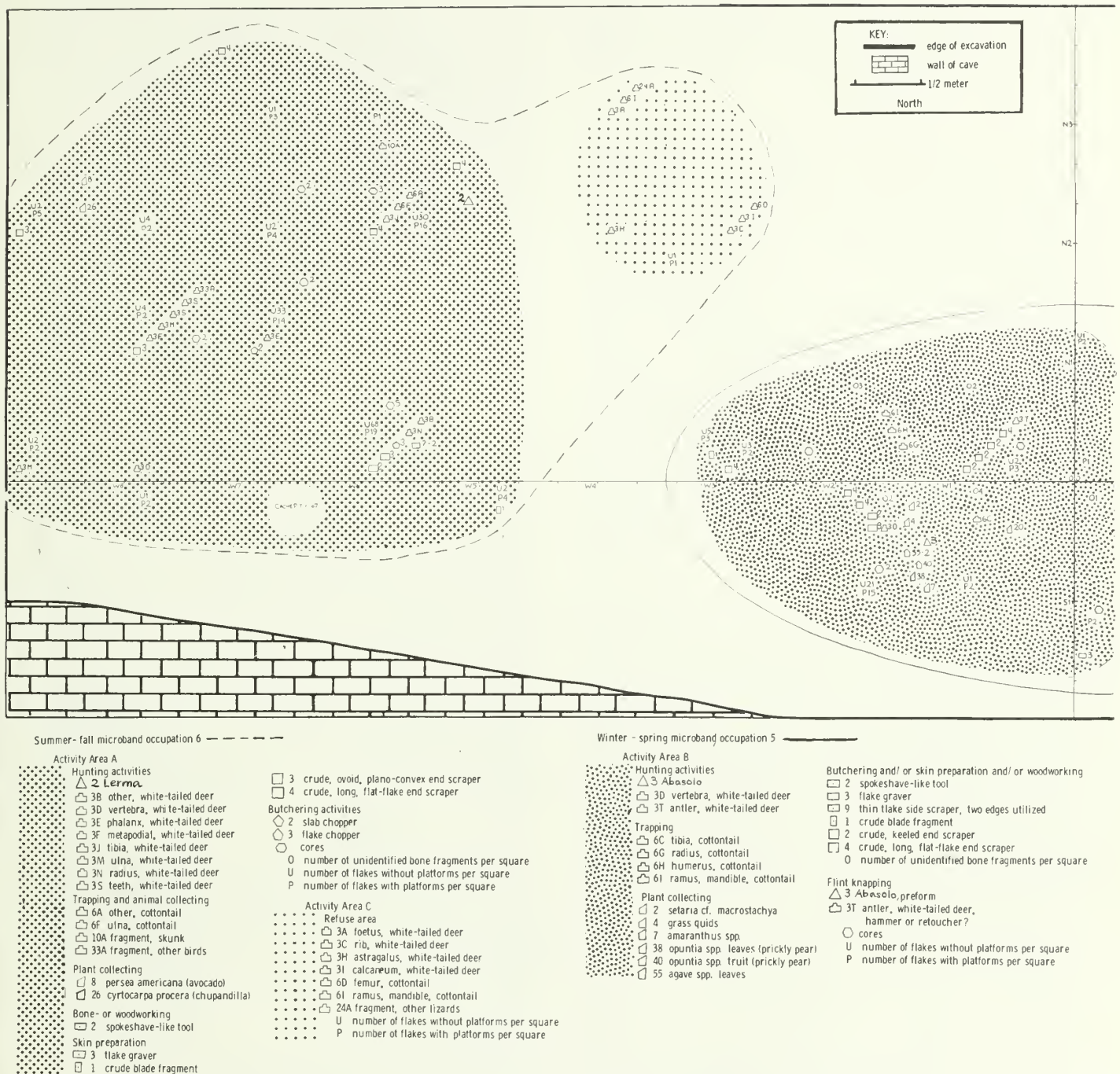


Fig. 103. Activity areas of Zone XXIV of Tc 50, with a key to their artifacts and ecofacts.

the burin, chopper, blades, and keeled end-scaper suggest the zone was of the Ajuereado Phase (possible Occupation 4).

The Way of Life of Zone XXIV

Floor 1 was composed of gray and black laminated material within which were traces of red coloration, suggesting fire areas. The floor extended from E2 to W9 in a narrow band between 0 and N1 and included a well-defined lobe between W3 and W4 to S1. Two small patches of material, which seemed to belong to this floor, appeared at S1W1 and S1W8; traces of the zone were also found in intervening areas. The main part of this occupation floor was mounded up along the narrow band between 0 and N1, above the loose rock fill. This line of deposition may represent the dump or refuse area of persons who occupied the level of the loose rock fill. This material, which certainly belonged to this occupation, averaged about 14 cms. in thickness and covered an area of approximately 11 square meters, so that occupation debris had built up to the amount of about 15.4 cubic meters during the habitation of this floor.

One possible feature occurred in the floor (a cache pit, No. 67). There is no doubt that fires had been built, as indicated by the reddish patches, but no discrete or definable units were found.

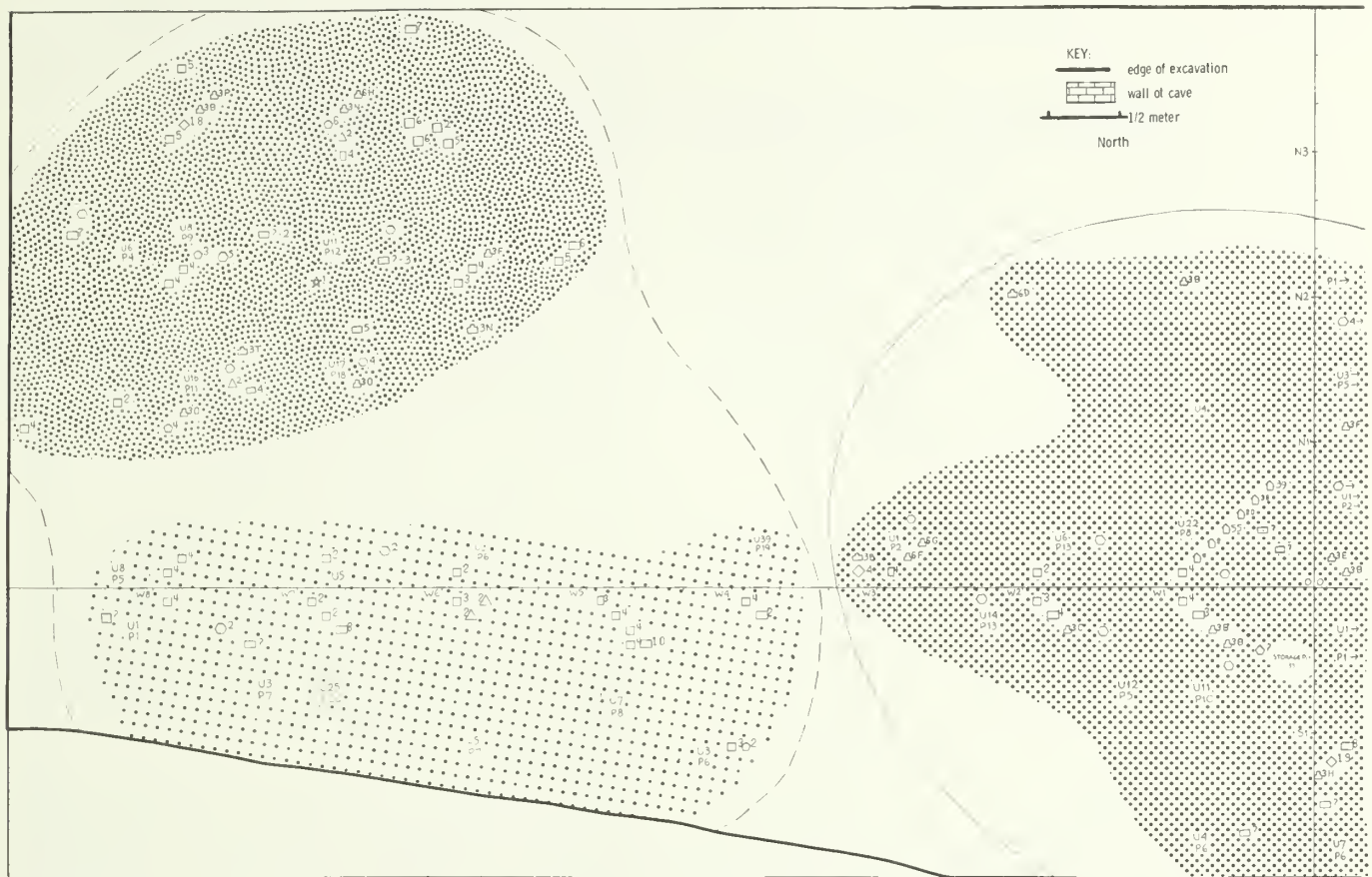
A detailed analysis of the distribution of bones, plant remains, chips, and artifacts, suggests three areal distributions within the general zone of occupation (Fig. 103). The first of these, Area A, included about 8 square meters of deposit between W5 and W9 concentrated between the 0 east-west line and N3. Within this area 5 end-scrapers, 4 side-scrapers, 1 crude blade fragment, 2 choppers, and a Lerma projectile point constituted the total artifact assemblage. There were also a few flint chips, bones of deer, parts of a skunk, a cottontail rabbit, and a bird, and avocado and chupandilla pits. The pits strongly suggest a wet-season to early fall occupation (Occupation 6); the extent of the area tells us that the size of the group was small. The projectile point, the bones, and a few plant remains indicate that the group's primary involvement was in hunting, along with some plant collecting and possibly some trapping. The choppers and many limb bones suggest some food was prepared in the cave, but the major part of the butchering may have been done at the kill site. On the basis of the graver and the 5 end-scrapers that were found in association with the bones of fur-bearing deer, rabbit, and skunk, one might hazard the guess that the inhabitants prepared the skins of the animals for clothing. Similarly, on the

basis of the spokeshave, we would say that woodworking was practiced by the inhabitants. The 14 cores and many flakes indicate that flint-knapping was done mainly by direct percussion on cores with unprepared platforms.

Area B encompassed about 6 or 7 square meters between 0 and W3 and between S1 and N1. Although both Areas A and B were uniformly small and so suggested microband occupations of each, there were several contrasts between the two. The material recovered from Area B was much more concentrated. It included 7 end-scrapers, 3 side-scrapers, and a tiny fragment of an Abasolo projectile point or quarry blank found with the chips. Remains were mainly those of deer, although there was also a rabbit jaw. Furthermore, an *Opuntia* flower, *Opuntia* leaf, grass, amaranth, and *Setaria* seeds were found here. These plants and the winter-hardened deer antler indicate a late winter to early spring visit (Occupation 5). The contrasting sets of seasonal indicators, the separate spatial locations, and the different kinds of projectile points in Areas A and B certainly show two distinct visits by two unrelated groups, even though the artifacts and ecofacts suggest that their activities were much the same. The antler tine and many cores and flakes in Area B seem to indicate that this group was also involved in flint-knapping, and that this was done by direct percussion on cores with unprepared platforms. The tiny fragment of a possible Abasolo point, found among the chips and not in our original typology charts, may have been a preform awaiting pressure retouch on its edges.

Area C, located between N2 and N4 from W2 to W4, was a concentration of only animal remains and a few chips. These included bones of deer, a deer fetus, racerunners, and Audubon cottontail rabbit. Square W3N3 contained the most varied representation of animal remains. The lizard bone and deer fetus suggest that the occupation of Area C occurred at roughly the same time of year as did that of Area A and therefore was probably a refuse or discard area of Occupation 6. There is still a possibility that it represented some sort of brief and separate task-oriented visit to the cave.

The age of Floor 1 can be determined from an appraisal of the Carbon-14 data for the zones above and below it. It has been suggested that the date of Zone XXV below was before 7600 B.C. The date of Zone XXIII, or Floor 2, above is about 7200 to 6700 B.C.; therefore, a date of about 7200 \pm 400 B.C. for Floor 1 (Vol. 4 of this series, Chap. 1) seems correct. These dates have been assigned to the Ajuereado Phase.



- Winter microband occupation 7
- Activity Area A
- Hunting activities
 - 2 Lerma
 - 3B other, white-tailed deer
 - 30 vertebra, white-tailed deer
 - 3F metapodial, white-tailed deer
 - 3N radius, white-tailed deer
 - 3P scapula, white-tailed deer
 - 3T antler, white-tailed deer
 - Trapping
 - 6H humerus, cottontail
 - Butchering and/ or skin preparation
 - 4 thick flake side scraper, one edge retouched
 - 5 thick flake side scraper, two edges retouched
 - 6 thick flake side scraper, one edge utilized
 - 7 thick flake side scraper, two edges utilized
 - 2 crude, keeled end scraper
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 3 flake chopper
 - 6 ellipsoidal chopper
 - 4 crude blade, prepared platform
 - 1 worked antler or bone
 - Flint knapping
 - 18 muller or hammerstone
 - 4 blocky-core chopper
- Activity Area B
- Hunting activities
 - 2 Lerma
 - Woodworking
 - 2 spokeshave-like tool
 - Skin preparation and/ or butchering
 - 7 end scraper fragment
 - 2 crude, keeled end scraper
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 7 side scraper fragment
 - 8 thin flake side scraper, one edge utilized
 - 10 thin flake side scraper, one edge retouched
 - 3 crude blade, unprepared platform
 - 2 slab chopper
 - Flint knapping
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
- Activity Area C
- Butchering and skin preparation
 - 3 flake graver
 - 4 thick flake side scraper, one edge retouched
 - 8 thin flake side scraper, one edge retouched
 - 4 crude blade, prepared platform
 - 2 crude, keeled end scraper
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 3B other, white-tailed deer
 - 3C rib, white-tailed deer
 - 3E phalanx, white-tailed deer
 - 3F metapodial, white-tailed deer
 - 3H astragalus, white-tailed deer
 - 60 lemur, cottontail
 - 6F ulna, cottontail
 - 6G radius, cottontail
 - Plant collecting and preparation
 - 4 cylindrical pestle
 - 19 metate fragment
 - 2 setaria ct. macrostachya
 - 4 grass quids
 - 20 prosopis juliflora seeds (mesquite)
 - 55 agave spp. leaves
 - 38 opuntia spp. leaves (prickly pear)
 - 39 opuntia spp. seeds (prickly pear)
 - Flint knapping
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
- Spring microband occupation 8

Fig. 104. Activity areas of Zone XXIII of Tc 50, with a key to their artifacts and ecofacts.

The Way of Life of Zone XXIII

Floor 2 on Zone XXIII was also concentrated in the western half of the site, but was much more extensive than the previous one. The debris of occupation was largely dark gray in color, and laminated. Although no fire pits were located, the color of the soil suggested fire-building activity. The thickness of the occupational debris averaged about 15 cms., and the area covered 38.5 square meters from E3 to W9 between N4 and S2. It appeared to have been a continuous occupation; that is, there were no breaks in the debris deposited. However, further investigation indicated that there were at least two separate occupations of the floor.

Breaking down the distribution of artifacts, bones, and plant remains in more detail, we found three possible activity areas relating to the occupations of this particular zone (Fig. 104). Area A, between N1 and N4 from W5 to W9, contained associated scraper-planes, 2 Lerma projectile points, both side- and end-scrapers, a blade, bifaces, a mano, chips, and many deer bones, a deer antler, and the humerus of a cottontail rabbit. Both the size of the area and the deer antler suggested a winter microband occupation; the mano or muller may have meant that it lasted into the spring. The bones and projectile points suggested that hunting was the dominant activity, along with some rabbit-trapping. The muller may mean some seed-collecting, but it also could have been used as a hammer in flint-knapping. Other activities were difficult to discern, but the bones and accompanying artifacts hint that butchering, skin preparation and flint-knapping may have occurred during the occupants' brief sojourn. It would appear that the biologic population was performing the usual range of dry-season activities. This area of Occupation 7 contrasted with Area C, Occupation 8.

Area C was concentrated largely from W2 to E2 between S1 and N1. Within this area were found side- and end-scrapers, a metate, Feature 4, a stone pestle, flint chips, many deer and cottontail rabbit remains, and a storage pit (Feature No. 35). The last was basin-shaped, about 20 cms. in diameter, and had been dug into the rock floor 50 cms. south of the 0-0 point of the grid. There was no evidence of fire in Feature 35. It contained *Setaria* seeds, mesquite seeds, and *Opuntia* seeds and leaves. This seems to indicate that Area C was a distinct spring microband occupation of Floor 2, and the artifacts and ecofacts may signify that it was an occupation of a few individuals who came to the shelter to perform specific tasks. The seeds and the

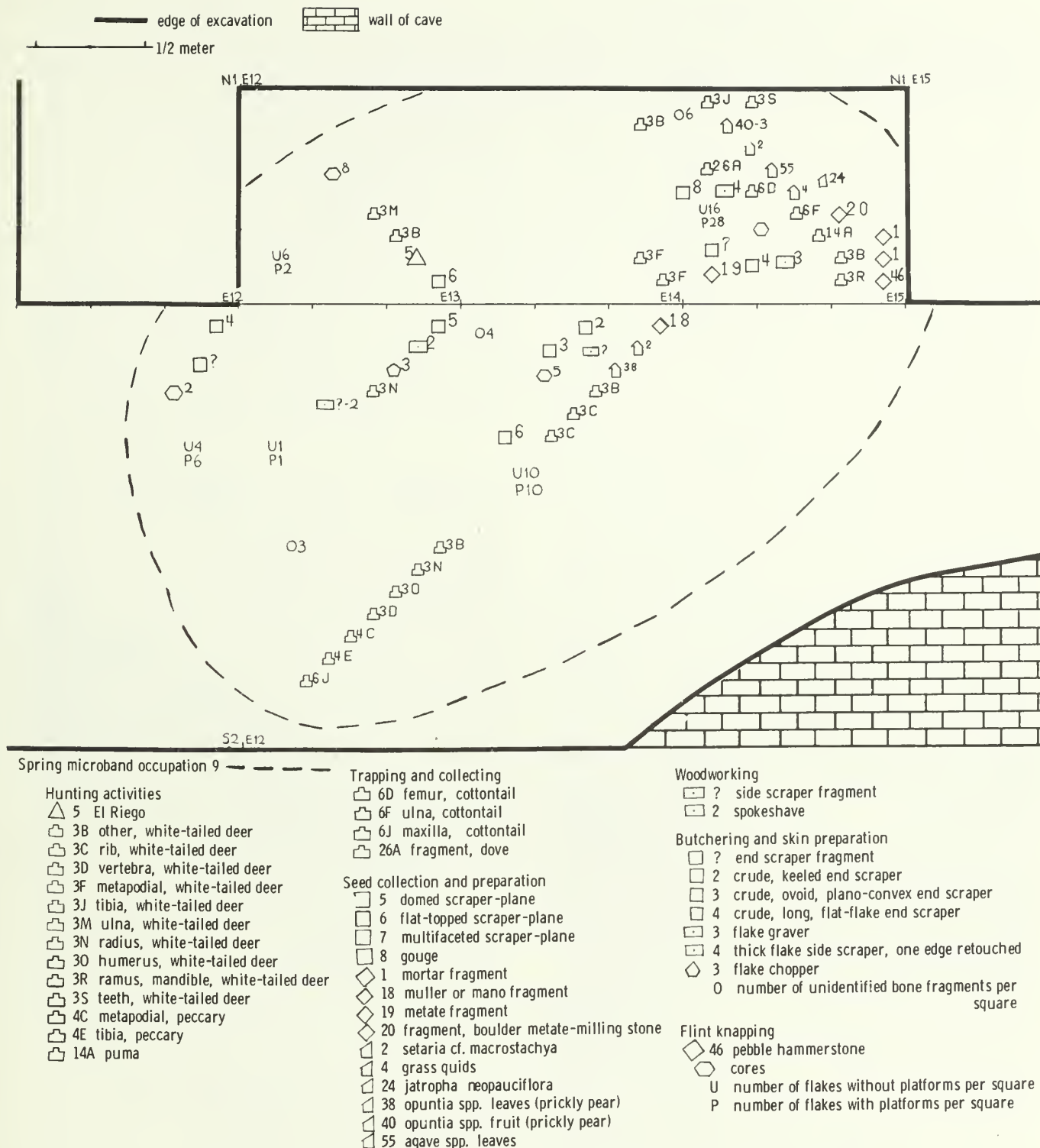
metate and pestle found in association with a limited number of animal bones (there were no projectile points) suggest that seed-collecting was a more important activity during this stay than either hunting or trapping. The scrapers, graters, and bones of fur-bearing animals hint at other activities, such as skin-scraping. The cores and flakes indicate some flint-knapping may have been undertaken.

The activities of Area C differed from that of Area A and seemed to differ from Area B. Area B was concentrated between the east-west line and S2, from W3 to W9. No animal remains, plant remains, or seed-grinding tools were found in this area; but side- and end-scrapers, a blade, a biface, chips, and 2 Lerma projectile points were found together here. The absence of grinding tools and bones distinguished Area B also, from the adjacent Area A, although the artifacts present suggest similar activities; there was evidence of hunting, skin preparation and/or butchering, woodworking, and flint-knapping. Thus, we could not definitely determine whether Area B represented a separate microband occupation or an aberrant part of Activity Area A, Occupation 7, but we suspect it was the latter.

This zone does evidence more diversified activity than earlier zones, with a wider variety of artifacts in the tool kit; yet, the artifact complex as a whole placed it clearly in the Ajuereado Phase. The time range suggested for Floor 2, Zone XXIII, on the basis of radiocarbon assays (Vol. 4 of this series, Chap. 1), is between 7200 and 6700 B.C.

The Way of Life of Zone XXII

Floor 3 on Zone XXII was found only in the eastern section of the excavation between E10 and E15, where, like Zones XXI, XX, and XIX, it underlay Zone XVIII as did Zones XXIII and XXIV in the west. There is no direct stratigraphic evidence that the early western zones predate these easterly zones. However, study of the artifact trends shows that Zone XXII in the east followed directly after Zone XXIII in the west, even though it was not stratigraphically above it. The zone was composed of a yellow to reddish-brown sandy material, probably rock fragments and dust, and contained patches where plant remains were well preserved. There was no indication of pits or other features, and it is probable that the main concentration or living area of this floor lay beyond the limits of the present excavation. Our sample, then, may represent only a small portion of the activities that possibly took place during this period of habitation. However, even if the unexcavated portion were to be



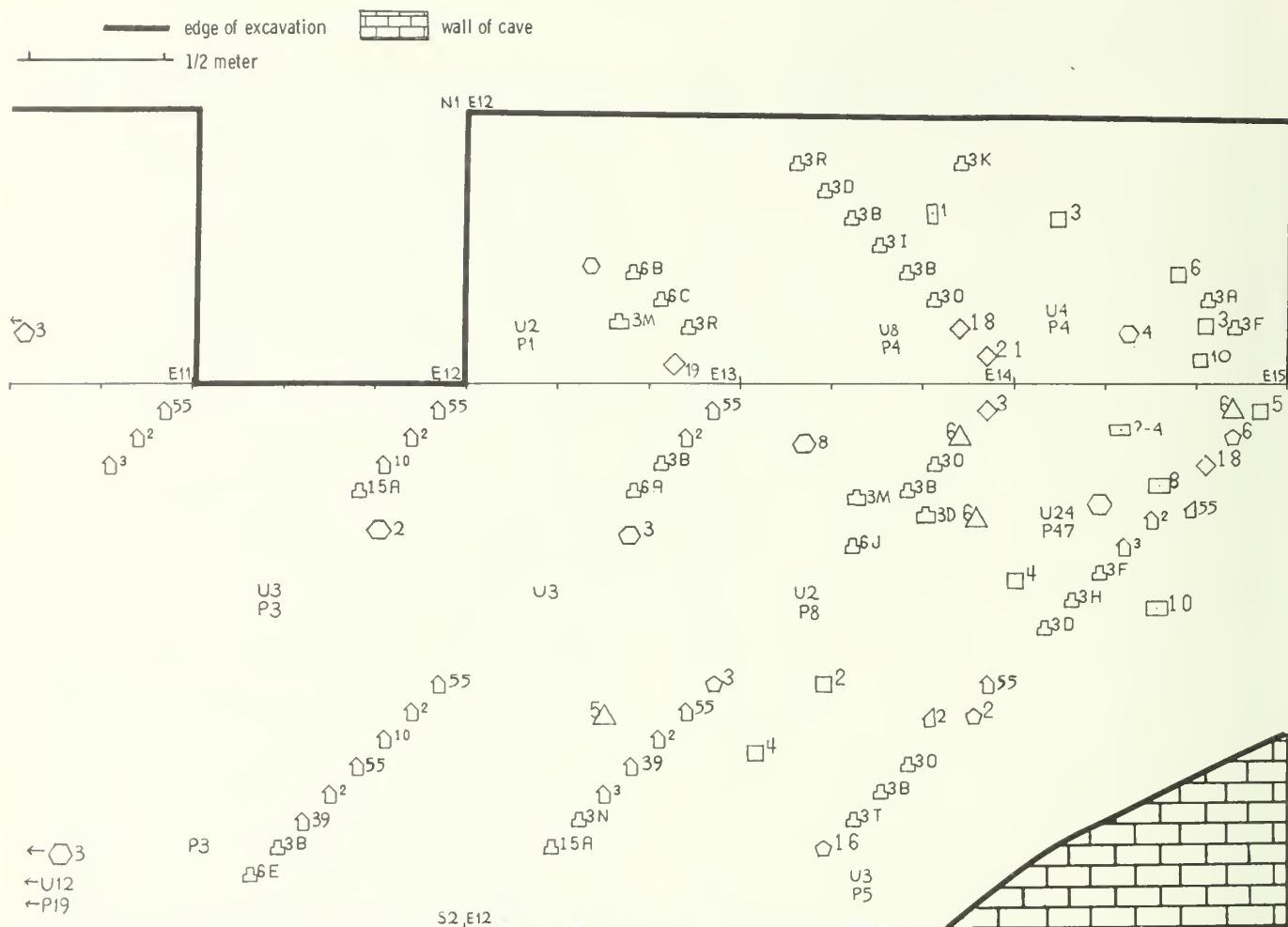


Fig. 106. Activity area of Zone XXI of Tc 50, with a key to its artifacts and ecofacts.

as large as the excavated portion, the floor would still be considered small, suggesting occupation by a microband.

The plant remains from the eastern part of the floor, because they included grass, *Setaria*, and *Lemaireocereus* seeds, as well as jatropha pits and *Opuntia* leaves and fruit, indicated a spring occupation; none of the bone remains from the western part gave seasonal evidence to the contrary. Thus, it seems that it was a single occupation, No. 9, even though the plant remains and grinding stones occurred to the east, and the single El Riego projectile point (in two pieces) and 6 end-scrapers occurred to the west. This sort of distribution could be considered a basis for establishing two activity areas for the occupation, but the way the bones, chips, and artifacts of the same types were scattered from one end to the other did not justify dividing the floor.

Even so, the mortar, mano, metates, scraper-planes, and gouge, found together with the seeds, did indicate that some people were preparing plant food in the eastern part of the floor, and that seed, leaf, and fruit collecting were important activities of this spring visit. The El Riego projectile point and puma, peccary, and deer bones testify that hunting was almost as important; the rabbit bones pointed to trapping as their "spare time" activity. The cracked bones, chopper, and thick flake side-scraper tell us that some of this meat was prepared for food in the shelter, but the high proportion of limb bones suggested that much of the initial butchering was done elsewhere.

Scraping skins is probably indicated by the presence of three end-scrapers, two scraper-planes, a flake graver, and a side-scraper found in the northeast quarter of the floor in association with the bones of fur-bearing animals.

A spokeshave and many chips, as well as cores, core-like scraper-planes, and a hammerstone were found; perhaps woodworking and flint-knapping were undertaken during the brief spring visit or visits. This relatively wide range of economic activities suggests that the occupation may have been that of a family group.

The time of this ninth occupation in Zone XXII is set at between 6725 and 6225 B.C. Analysis of the artifacts from this and other sites in the Tehuacan Valley reveals that the materials recovered from Zone XXII of the Coxcatlan Rock Shelter are the earliest representations of the El Riego cultural phase.

The Way of Life of Zone XXI

The second occupational zone of the El Riego Phase, Zone XXI, was localized in the easternmost portion of

the excavation area, from E11 to E15 between N1 and S3 (Fig. 106). Brownish-gray in color, the zone consisted largely of a mixture of sand and ash with more preservation per cubic unit than in the preceding zones.

The same cautions must be applied to this zone as were mentioned for the previous zone; that is, we recovered only a limited amount of material representing the activities which took place here. The main part of the occupational floor may have extended north beyond the area of excavation; nevertheless, it still could not have provided room for very many people. The remains of spring grass and cactus seeds, as well as the deer fetus and antler with velvet, seemed to indicate a brief Occupation (No. 10) during the wet season.

The limited evidence of the floor makes it difficult to reconstruct the activities of this wet-season microband; however, the seeds certainly indicated that seed-collecting went on, and the large animal bones found in association with projectile points evidence hunting. The smaller mammals might have been trapped. The various grinding stones, the split bone, and various sharp-edged cutting implements, such as choppers and side-scrapers, clearly point to an involvement in food preparation, both plant and animal. Other activities were more difficult to pin down. Flint chips and bifaces and scraper-planes which could be cores, may have meant flint-knapping, while end-scrapers associated with the deer bones suggested hide-working. These activities would have been enough to sustain life, but it was difficult for us to determine whether these floor remains represented a task-oriented visit by, or the home base for, a family.

Carbon-14 determinations were obtained from material of this zone; however, its age can be assessed from the dates set on the zones above and below it, which suggest that this zone must have been occupied about 6300 B.C. \pm 200 years. The artifact types found on this floor clearly defined it as a component of the El Riego Phase.

The Way of Life of Zone XX

The fifth floor, Occupation 11, was located in the southeastern corner of the excavation, from the E6 line eastward and from the N1 line southward. The zone was gray with several yellowish lenses of decomposed rockfall, as well as charcoal lines, within it. In addition, it was capped by a distinct, thin, charcoal floor.

When the artifactual and ecofactual data were plotted on maps and their distributions analyzed, three

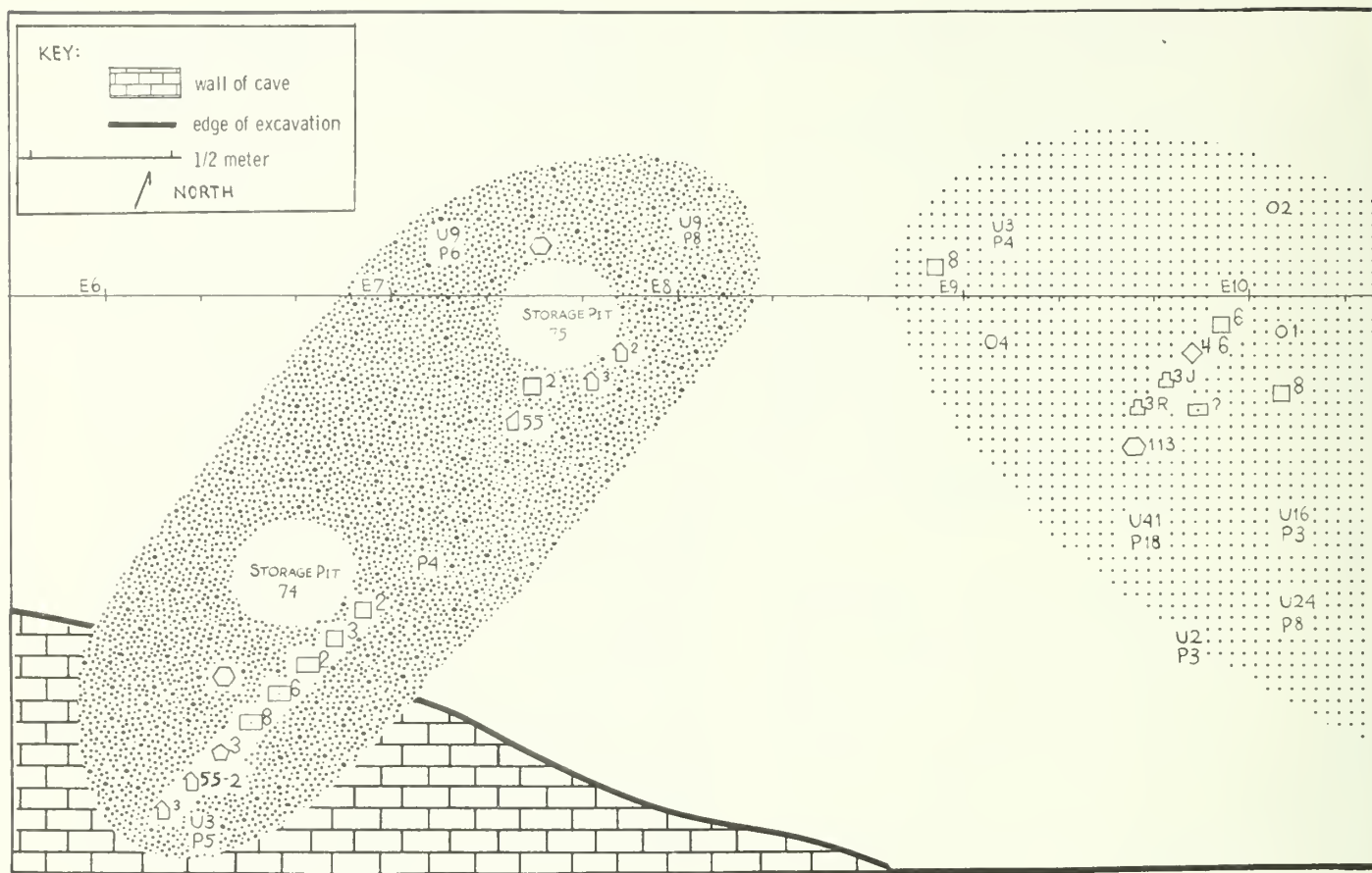


Fig. 107. Activity areas of Zone XX of Tc 50, with a key to their artifacts and ecofacts.



Activity Area C

Hunting activities

- △ 2 Lerma
- ☐ 3B other, white-tailed deer
- ☐ 3C rib, white-tailed deer
- ☐ 3J tibia, white-tailed deer
- ☐ 3K femur, white-tailed deer
- ☐ 3L innominate, white-tailed deer
- ☐ 3N radius, white-tailed deer
- ☐ 3R ramus, mandible, white-tailed deer
- ☐ 3T antler, white-tailed deer
- ☐ 4F humerus, peccary

Trapping

- ☐ 6A other cottontail
- ☐ 6I ramus, mandible, cottontail
- ☐ 24A lizards
- ☐ 34A fish

Butchering and skin preparation

- ☐ 3 crude, ovoid, plano-convex end scraper
- ☐ ? side scraper fragment

- ☐ ? blade fragment
- 6 ellipsoidal chopper
- 0 number of unidentified bone fragments per square

Plant collecting and processing

- ◇ 1 mortar fragment
- ◇ 18 muller or mano fragment
- ◇ 19 metate fragment
- ◇ 20 boulder metate-milling stone
- ☐ 8 gouge
- ☐ 2 setaria cf. macrostachya
- ☐ 3 unidentified grass seeds
- ☐ 55 agave spp. leaves

Flint knapping

- ☐ 4 crude, long, flat-flake end scraper
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

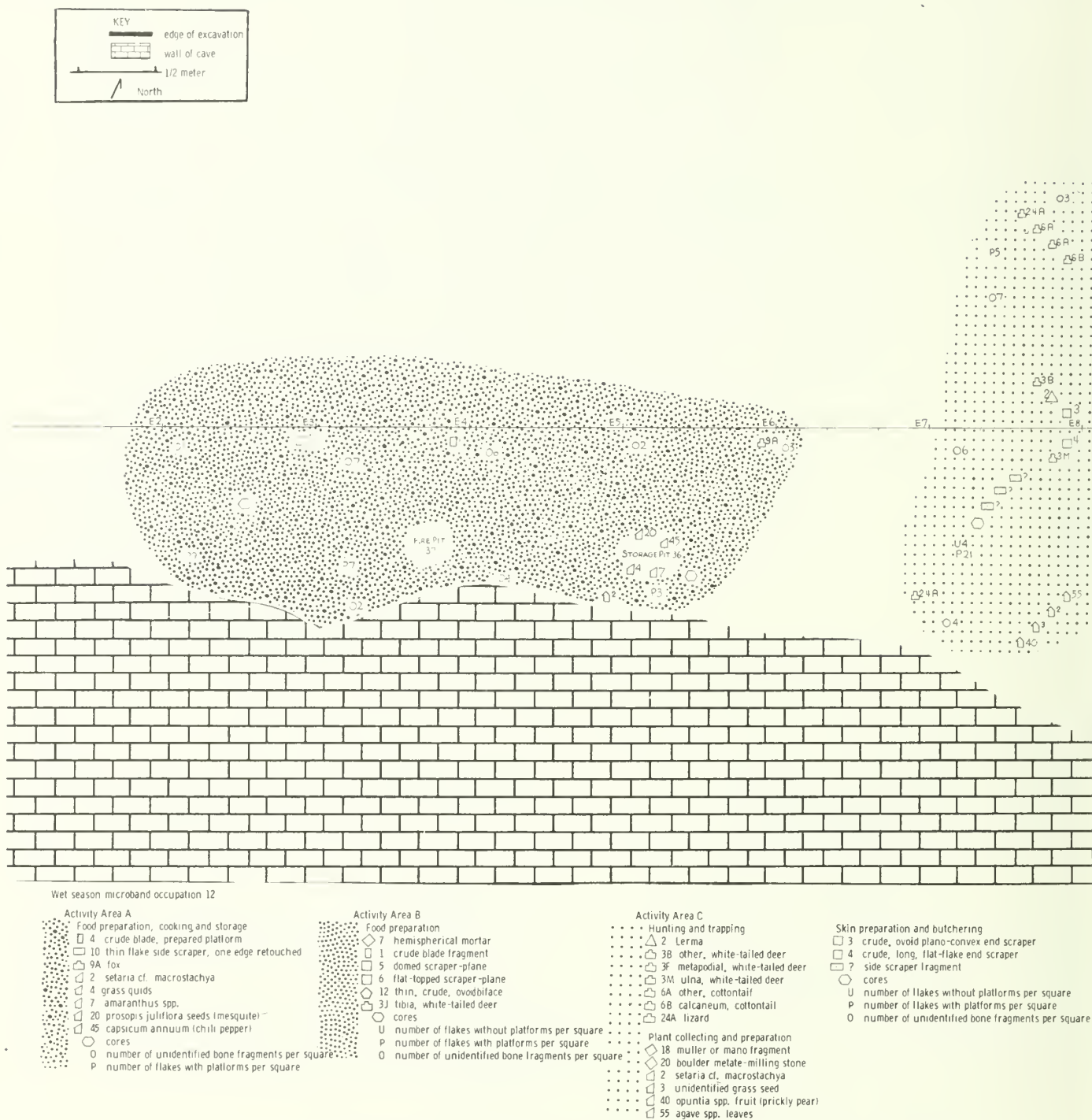
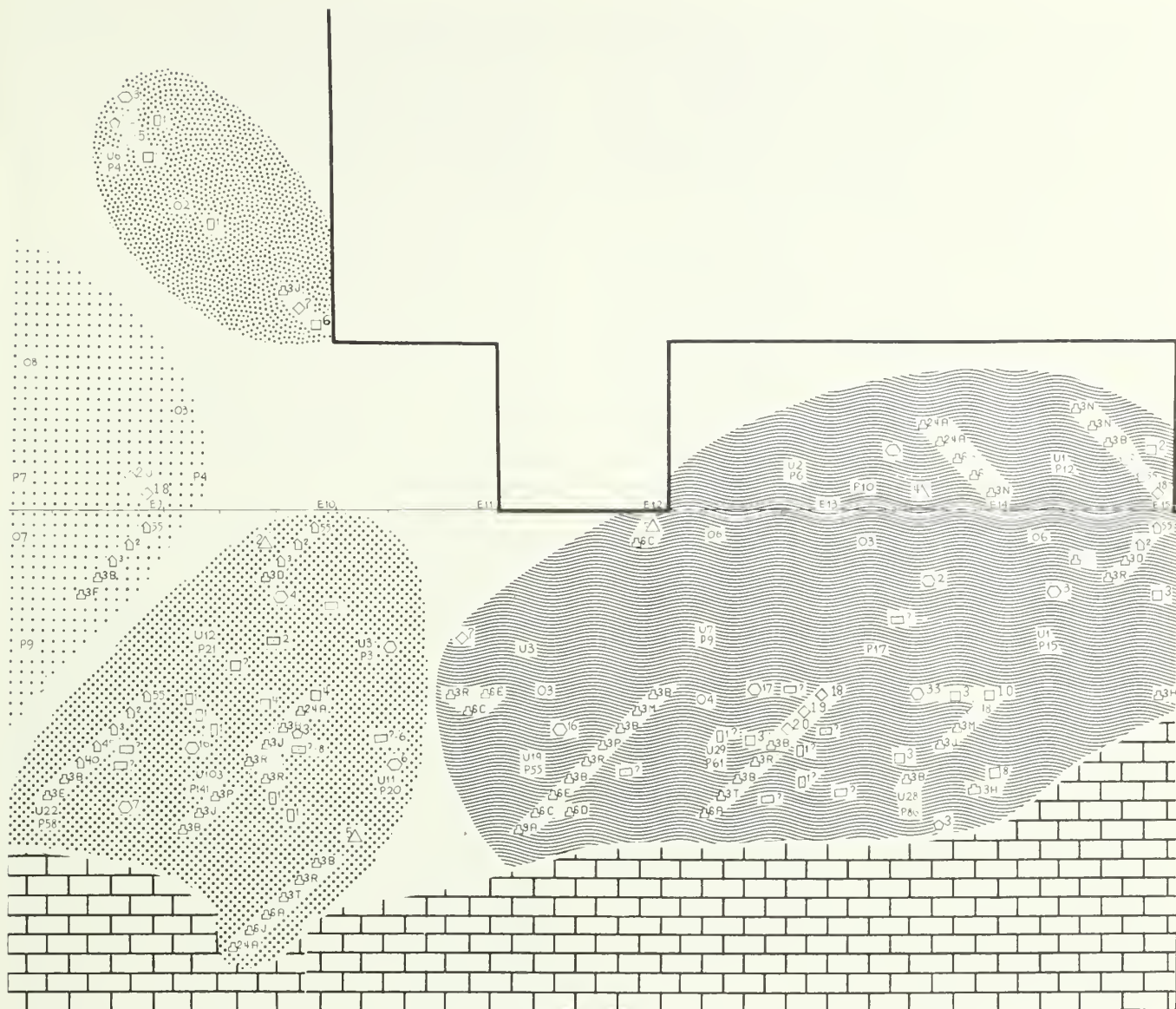


Fig. 108. Activity areas of Zone XIX of Tc 50, with a key to their artifacts and ecofacts.



Activity Area D

Hunting and trapping

- 2 Lerma
- 5 El Riego
- 3B other, white-tailed deer
- 3D vertebra, white-tailed deer
- 3E phalanx, white-tailed deer
- 3J tibia, white-tailed deer
- 3P scapula, white-tailed deer
- 3R ramus, mandible, white-tailed deer
- 3T antler, white-tailed deer
- 6A other, cottontail
- 6J maxilla, cottontail
- 24A lizard
- 2 setaria cf. macrostachya
- 3 unidentified grass seeds
- 4D opuntia spp. fruit (prickly pear)

- 45 capsicum annuum (chili pepper)
- 55 agave spp. leaves
- Skin preparation and butchering
 - 1 crude blade fragment
 - 2 end scraper fragment
 - 4 crude, long, flat-flake end scraper
 - 7 side scraper fragment
 - 2 spokeshave-like tool
 - 3 flake chopper
- Flint knapping
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square

Activity Area E

Hunting and trapping

- 4 Plainview
- 6 Flacco
- 3B other, white-tailed deer
- 3H astragalus, white-tailed deer
- 3J tibia, white-tailed deer
- 3M ulna, white-tailed deer
- 3N radius, white-tailed deer
- 3O humerus, white-tailed deer
- 3P scapula, white-tailed deer
- 3R ramus, mandible, white-tailed deer
- 6A other, cottontail
- 6C tibia, cottontail
- 6D femur, cottontail
- 6E innominate, cottontail
- 6G radius, cottontail

- 9A fox
- 24A lizard
- Plant collecting and preparation
 - 7 hemispherical mortar
 - 18 muller or mano fragment
 - 19 metate fragment
 - 20 boulder metate-milling stone
 - 8 gouge
 - 10 crude, discoidal end scraper
 - 2 setaria cf. macrostachya
 - 55 agave spp. leaves

Skin preparation and butchering

- 2 blade fragment
- 2 side scraper fragment
- 2 crude, keeled end scraper
- 3 crude, ovoid, plano-convex end scraper
- 3 flake chopper
- 0 number of unidentified bone fragments per square

Bone-working

- 3T antler, white-tailed deer, hammer
- cores

Flint knapping

- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

possible activity areas were noted (Fig. 107). The seasonality data from these areas strongly suggested that all belonged to a single, wet-season, microband, Occupation No. 11. Activity Areas A, B, and C contained seeds harvestable in the wet, late spring, while B and C had antler tine with velvet, which normally occurs between June and August. Also, Area C had lizard and fish remains indicative of the wet season.

Area A occurred between E6 and E9 from N1 to S2. The concentration of material ran roughly diagonally from N1E9 to S2E6. Included in this area were 3 side-scrapers, 3 end-scrapers, 1 chopper, and 2 storage pits (Feature Nos. 74 and 75). The pits were from 30 to 40 cms. in diameter, shallow, basin-shaped, and filled with small seeds. No animal bones came from this area, which differed from the others specifically in its quantity of plant remains. The storage pits containing grass seeds and other plants also suggested that this was a seed-processing area, or else an area where plants were stored by hunters whose chief use of the camp is illustrated particularly by Activity Area C. The chopper, end-scrapers, flakes, cores, and side-scrapers of Area A were probably used in the processing of plants.

Area B covered 3 square meters in Squares S1E10, S1E11, and S2E11. The materials found in association here were a pebble hammer, a scraper-plane, a blade, 5 end-scrapers, and many cores and flakes. Some deer remains and remains of a dove were found within this concentration. The many flint chips, usually with prepared striking platforms, and the scraper-plane, probably a core, in association with the hammerstone, indicated that a major activity in this area was flint-knapping. The other 5 end-scrapers and the blade, all associated with deer bones, suggested butchering and skin preparation as well.

The third concentration, Activity Area C, lay between E11 and E15 from N1 to S2. This area was the most complex. It included most of the animal bones recovered from the zone, as well as end-scrapers, a Lerna projectile point, and mortar, mano, and metate fragments. This seemed to be an area largely related to hunting and butchering activities, yet a large fish bone was found here. The mano and metate fragments may indicate that the occupants ground the seeds stored in Area A and in Area C, and the end-scrapers may mean that skins were prepared here, as well as in the other areas. The ellipsoidal chopper, cores, and flakes seemed to show flint-knapping as another concern.

If the three areas were of one visit, then the wide range of technological and economic activities suggest

that we are dealing with a biologic family, the members of which divided and shared their time and individual talents in a coordinated division of labor effort.

The El Riego artifacts of this floor were extremely similar to those of Zone XXI, so we would guess they were roughly of the same time, about 6250 B.C. \pm 200 years.

The Way of Life of Zone XIX

More extensive than the floors below it, Floor 6 on Zone XIX spread across the eastern half of the site along the back portion of the shelter. It ran close along the back wall of the cave in a band about 1.5 to 2 meters wide from E2 to E7, expanding there into a much wider area and continuing to the eastern limits of the excavation around the E15 line (see Fig. 108). It was a yellowish stratum composed of a mixture of rock dust and ash.

Four of the five activity areas on this floor had bones and/or plant remains that suggested that this was a single, wet-season occupation. Lizard bones were found in Areas C, D, and E, and such plants as amaranth and chili in Areas A and D. Furthermore, Floor 6 contained a single defined fire pit in Area A, and evidence of a wide range of activities occurring in the various areas. One is tempted to suggest, therefore, that this zone represents a single occupation by a family (Occupation 12) rather than an intermittently-occupied hunting camp or a task-oriented visit, as some of the previous zones suggested to us.

Five activity areas were indicated from the distribution of artifacts and ecofacts of this presumably single occupation. The first of these, Activity Area A, covering the western, narrow margin of the occupation floor, contained no animal remains. It did, however, contain two features. One of these, Feature No. 37, was a small basin-shaped fire pit, about 30 cms. in diameter. The other, Feature No. 36, appeared to be a storage pit. It was 35 cms. in diameter, and filled mainly with small seeds. Of the five different species of plants identified from among the seeds recovered from the storage pit, including grass, *Setaria*, amaranth, and mesquite, none were domesticated—with the possible exception of *Capsicum*, or chili. The latter were black in color, like wild ones, and not red, like domesticated ones. This we have interpreted as indicating that the food-gatherers were using plants that were potentially domesticates; and, as we shall see, some red varieties of amaranth were first seen in Zone XVIII, and, again, in Zones XVI-XIV.

Associated with these features in Area A were one thin flake side-scraper, one crude blade, and a limited

number of chips. Fragments of a gray fox as well as much burned, smashed bone were found near the fire pit. Area A seems to have been an area of plant storage, cooking, and possibly, food preparation.

Activity Area B was located in Squares N3E9 and N2E10. One deer bone was found here together with 2 blade fragments, a mortar, 3 scraper-planes, and one biface. Exactly what was being done here is difficult to determine, but food preparation seems likely.

Activity Area C, located to the south of B, and covering roughly 5 square meters between E7 and E9 and N2 and S2, contained 2 end-scrapers, 3 side-scraper fragments, a Lerma projectile point, and muller and milling-stone fragments, as well as plant and animal remains. The animal bones, primarily deer, but including also many small, shattered fragments of rabbit and lizard, were scattered over this area, as they were over most of the eastern half of the occupation floor. While the muller fragment and milling stone suggested some involvement in seed-grinding, the many shattered bones indicated butchering and/or meat-food preparation, perhaps a bone gruel. The projectile point and end-scrapers also seemed to point to both hunting and skin preparation.

Activity Area D was concentrated in Squares S2E9 to S2E11 and S1E10, and was not readily distinguishable from Areas C and E on either side of it, in terms of an isolated cluster of artifacts. It contained the bones of deer, rabbit, and lizard, along with 3 end-scrapers, numerous blade and side-scraper fragments, a chopper, two lanceolate projectile points, and many flint chips and cores. Although there were plant remains, there were no grinding stones, in contrast to Areas C and E. The projectile points, one El Riego concave fluted, and a Lerma, were found in association with many chips, which included a fragment of a basal flute, and suggest that both flint-knapping and the manufacture of the points were done in this area.

Along with the abundant animal bone remains from the entire floor, representing perhaps 84.75 liters of meat, the points in Areas C, D, and E had other implications. First of all, it was apparent that by this time hunting was still an important activity, probably more so than either trapping or plant collecting (which included seeds of potential domesticates such as chili). Furthermore, Flacco and Plainview points from Area E and the El Riego point from Area D may indicate that a new way of hunting was becoming popular—spearing animals with heavy points which had basal barbs to hold the point inside the animal. And, as was suggested earlier, the method of stalking the animal with the atlatl dart may have begun to predominate

over that of ambushing with lances that had lanceolate, unbarbed tips.

The end-scraper and chopper associated with the bones indicate with probability that skin preparation and butchering or meat preparation were carried on in this part of the floor (Area D).

Activity Area E, located between E11 and E15 from N1 to S2 and the cave wall, had within it an antler hammer, many cores and flakes, 7 end-scrapers, blade and side-scraper fragments, a chopper, mortar, mano and metate fragments, and one Flacco and one Plainview point. The bone remains were mostly of deer. The antler hammer suggested that bone-working occurred here. This area was much like Area C, and we infer from the artifacts the same categories of activities—hunting, butchering, skin-working, and seed preparation; additionally, Area E, like D, had abundant evidence of flint-knapping.

The artifact complex was very similar to that of the previous El Riego component, Zone XX, and one might estimate that Occupation 12 in Zone XIX was of roughly the same time, ca. 6400 to 6000 B.C.

The Way of Life of Zone XVIII

Floor 7 on Zone XVIII was the first one to extend over the entire excavated area (Fig. 109). This occupation floor was broken by two rockfalls, one lying between E2 and E5 from N1 to N3, and the other, much smaller, centered around N1W6. The habitation floor reached its maximum height around Square S1W1, from where it dropped off in all directions. Here, the floor was a meter and a half higher than the floor level at the eastern end of the shelter and measured about 2 meters above the edge of the occupation floor at the west end where the slope trailed away. The stratum varied in color from a gray-brown to a pinkish-gray. In several places it was laminated and contained small floors within it. The zone itself was capped with a more definite, thin, dark brown floor.

We plotted artifact distribution per square meter, using only complete and measurable artifacts to render interpretations of function as sure as possible. For this purpose, there were 180 measurable artifacts. By plotting these distributions, several concentrations and certain associations of artifacts were noted. These will be described as Activity Areas A through G.

Besides this breakdown into activity areas, we postulate a seasonal breakdown of this living floor; that is, it is plausible from the evidence that the entire living floor was not occupied at any one given time of year.

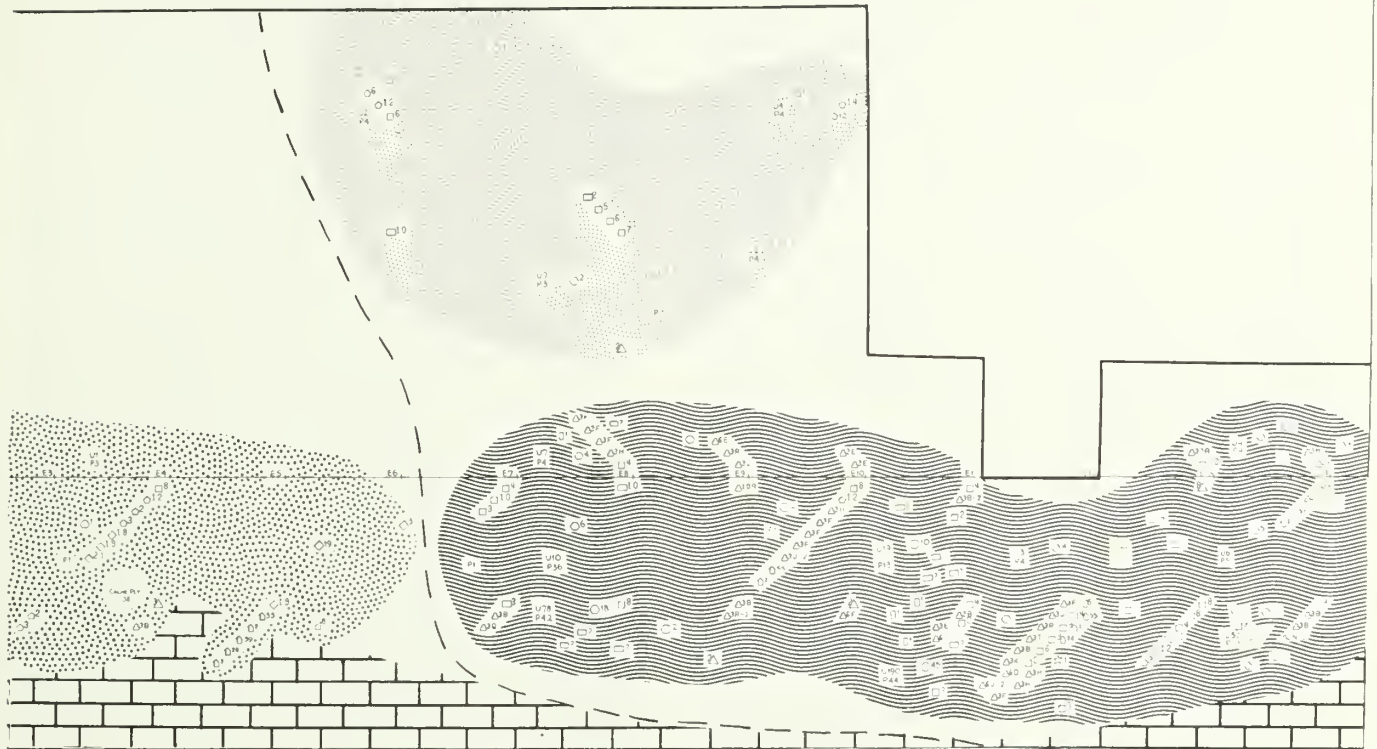
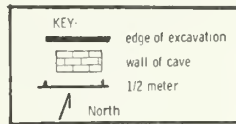
Flannery's analysis of the animal bones, the antler



Wet season microband occupation 14-B-E, G

- Activity Area B**
- Plant processing
 - 1 mortar fragment
 - 18 muller or mano fragment
 - 19 metate fragment
 - 20 boulder metate-milling stone
 - 46 hammer or pestle
 - 4 crude blade, prepared platform
 - 7 side scraper fragment
 - 2 spokeshave-like tool
 - 3 flake graver
 - 4 thick flake side scraper, one edge retouched
 - 5 thick flake side scraper, two edges retouched
 - 6 thick flake side scraper, one edge utilized
 - 8 thin flake side scraper, one edge utilized
 - 2 slab chopper
 - 3 flake chopper
 - 6 ellipsoidal chopper
 - 12 thin, crude, ovoid bilate
 - 2 setaria cf. macrostachya
 - 3 unidentified grass seed
 - 7 amarantus spp.
 - 8 persea americana (avocado)
 - 39 opuntia spp. seeds (prickly pear)
 - 43 sideroxylon cf. tempisque (cosahuico)
 - 54 agave spp. quids
 - 55 agave spp. leaves
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
- Activity Area C**
- Plant processing and cooking area
 - 4 grass quids
 - 8 persea americana (avocado)
 - 20 prosopis (utiliflora) seeds (mesquite)
 - 55 agave spp. leaves
 - 1 crude blade fragment
 - 5 crude blade, pointed platform
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 8 gouge
 - 2 spokeshave-like tool
 - 4 thick flake side scraper, one edge retouched
 - 8 thin flake side scraper, one edge utilized
 - 2 slab chopper
 - 3 flake chopper
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
- Activity Area D**
- Hunting and trapping
 - 2 Lerma
 - 3B other, white-tailed deer
 - 3F metapodial, white-tailed deer
 - 3H astragalus, white-tailed deer
 - 3K femur, white-tailed deer
 - 3N radius, white-tailed deer
 - 3O petrous bone, white-tailed deer
 - 3R ramus, mandible, white-tailed deer
 - 6C tibia, cottontail
 - 6E innominate, cottontail
 - 6F ulna, cottontail
 - 6I ramus, mandible, cottontail
 - 6J maxilla, cottontail
 - 24A lizard
 - 34A fish
 - Food preparation
 - 4 crude blade, prepared platform
 - 5 domed scraper-plane
 - 6 flat-topped scraper-plane
 - 8 persea americana (avocado)
 - 1 mortar fragment
 - 4 cylindrical pestle
 - 18 muller or mano fragment
 - Skin preparation
 - 2 crude, keeled end scraper
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 7 side scraper fragment
 - 2 spokeshave-like tool
 - 4 thick flake side scraper, one edge retouched
- Refuse Area E**
- 5 thick flake side scraper, two edges retouched
 - 2 slab chopper
 - 3 flake chopper
 - 6 ellipsoidal chopper
 - Flint knapping
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
 - 19 metate fragment
 - 20 boulder metate-milling stone
 - 4 crude blade, prepared platform
 - 7 side scraper fragment
 - 2 crude, keeled end scraper
 - 5 domed scraper-plane
 - 6 flat-topped scraper-plane
 - 7 multifaceted scraper-plane
 - 8 gouge
 - 10 crude, discoidal end scraper
 - 2 slab chopper
 - 3 flake chopper
 - 6 ellipsoidal chopper
 - 3F metapodial, white-tailed deer
 - 6I ramus, mandible, cottontail
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square

Fig. 109. Activity areas of Zone XVIII of Tc 50, with a key to their artifacts and ecofacts.



Dry season microband occupation 13 - A, F

- Area G**
- Seed preparation, storage, and refuse area
 - 3 Abasolo
 - 3 lecomate mortar
 - 18 muller or mano fragment
 - 19 melate fragment
 - 21 ovoid muller
 - 8 gouge
 - 10 thin flake side scraper, one edge retouched
 - 2 slab chopper
 - 1 flake chopper
 - 12 thin, crude, ovoid biface
 - 2 setaria cf. macrostachya
 - 3 unidentified grass seed
 - 8 persea americana (avocado)
 - 20 prosopis juliflora seeds (mesquite)
 - 39 opuntia spp. seeds (prickly pear)
 - 55 agave spp. leaves
 - 38 other, white-tailed deer
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square

- Activity Area A**
- Hunting and trapping
 - 2 Lerma
 - 4 Plainview
 - 8 Tortugas
 - 3B other, white-tailed deer
 - 3C rib, white-tailed deer
 - 3E phalanx, white-tailed deer
 - 3F metapodial, white-tailed deer
 - 3H astragalus, white-tailed deer
 - 3J tibia, white-tailed deer
 - 3K femur, white-tailed deer
 - 3M ulna, white-tailed deer
 - 3N radius, white-tailed deer
 - 3Q petrous bone
 - 3R ramus, mandible, white-tailed deer
 - 3T antler, white-tailed deer
 - 60 femur, cottontail
 - 6E innominate, cottontail
 - 6F ulna, cottontail
 - 6J ramus, mandible, cottontail
 - 6L maxilla, cottontail
 - 10A skunk
 - 33A other birds

- Butchering and skin preparation**
- 1 crude blade fragment
 - 5 crude blade, pointed platform
 - 7 end scraper fragment
 - 2 crude, keeled end scraper
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 8 gouge
 - 9 thin-flake end scraper
 - 10 crude, discoidal end scraper
 - 7 side scraper fragment
 - 3 flake graver
 - 10 thin flake side scraper, one edge retouched
 - 7 chopper fragment
 - 3 flake chopper
 - 12 thin, crude, ovoid biface
 - 1 worked antler or bone
- Plant collecting**
- 2 setaria cf. macrostachya
 - 20 prosopis juliflora seeds (mesquite)
 - 55 agave spp. leaves

- Flint knapping**
- 6 flat-topped scraper-plane
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square

- Activity Area F**
- Butchering and skin preparation
 - 2 Lerma
 - 1 mortar fragment
 - 1 crude blade fragment
 - 5 domed scraper-plane
 - 6 flat-topped scraper-plane
 - 7 multifaceted scraper-plane
 - 2 spokeshave-like tool
 - 10 thin flake side scraper, one edge retouched
 - 6 ellipsoidal chopper
 - 12 thin, crude, ovoid biface
 - 14 large disk
 - cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square

remains, the types of species found, the epiphyses on the long bones, and so forth, suggested that the east end of the site represented largely by Activity Area A held a dry-season occupation (Occupation 13). All the bones were of animals which would have been born during the dry season. An *Opuntia* that flowers about March and *Setaria* seeds of the spring, also found in Area A, were consistent with this data. It is possible that Area F, just north of Area A, was connected with it, for it contained a Lerma projectile point, as did A, and a somewhat similar artifact complex. However, the complete lack of seasonally identifiable bones and plants make this conclusion somewhat speculative.

The occupation represented by Areas A and F contrasts with and was separate from one in the western part of the site, largely Activity Areas B, C, D, G, and probably E (Occupation 14). This was likely a wet-season occupation: it contained lizard, fish, dove, cottontail, skunk, and deer bones of a maturity indicating the rainy season of the year. The presence of avocado in Areas B, C, D, and G, cosahuico and amaranth in Area B, mesquite in C, *Setaria* in B, and both these last in Area G would confirm such a theory.

The two occupations differ also in terms of their artifact remains. Activity Area A in the east end evidenced, almost surely, hunting camp activity of a very specialized type, whereas the activities represented in the western part of the site were of a broader range and nature.

Since it is probable that in this western portion the site was occupied during the spring and through the wet season to the fall, and in its eastern half during the dry season to the spring, let us consider the two occupations separately, beginning with the eastern one (Occupation 13). Its total size suggests that Activity Areas A and F represented a microband winter-spring visit to the cave.

Area A, concentrated between E6 and E15 and N1 and S2, was an area of dense animal remains (primarily deer and Audubon cottontail) and many cores and chips. The artifacts associated with these bones were end-scrapers and projectile points, with some bifaces and scraper-planes concentrated toward the eastern end of the area. It seems obvious that this was an area of activity related to the hunt, and to the butchering and preparation of animals for food. The end-scraper, worked bone awl, bifaces, scraper-planes, cores, and flint chips probably were connected with skin preparation and flint-knapping activities. The few plant remains and the rabbit bone attest to limited plant-collecting and trapping.

Concentrated in the area of N2E8 were a Lerma

point, scraper-planes, side-scrapers, choppers, a blade and mortar fragment, and a few chips and cores, but no animal remains. This has tentatively been labeled Activity Area F.

Activity Areas A and F, therefore, seem to represent activities related strictly to hunting, meat- and hide-processing, and, possibly, flint-knapping. Generally, this bespeaks specialized activity of the dry season involving only a segment of the special group. It was what we are calling a "task force area" as compared to an area defined by a fuller range of activities—i.e., seed-processing, cooking, trapping, hunting, flint-knapping, etc., representative of the complete social unit. The artifact distributions throughout the western part of Zone XVIII describe such home-base activity areas. These were usually associated with wet- or multi-season occupations at Tc 50. Lying to the west of the dry-season task-force encampment, then, Activity Areas B, C, D, E, and G emerged as the work locales of a wet-season, home-base encampment on the same floor.

One relatively well-defined activity area, Area B, was located largely between E1 and W2, stretching from N3 to below S1. In this area were found manos, metates, a mortar fragment, scraper-planes, some choppers, both end- and side-scrapers, some animal remains, and many plant remains, including cosahuico, avocado, amaranth, *Agave*, *Opuntia*, *Setaria*, and grass. It seemed to us that this activity area was perhaps one associated mainly with the processing of plant food remains.

Activity Area C was located just to the west of Area B and ran roughly from N3 to S1 in a diagonal between N3W4 and S2W2. No animal remains were found in this activity area, but side- and end-scrapers, choppers, blades, cores and chips were contained in C, along with Feature No. 4A, a large block of consolidated ash, found in Square N3W4. It was not clear whether this was a fireplace or not. The stone artifacts associated with it showed no evidence of having been burned. The plant remains, including mesquite, avocado, grass, and *Agave*, were burned, however. Thus, like Area B, this was a plant-processing area, but, as well, it was a cooking or roasting locale. Other activities probably occurred here also. It is interesting to note that the avocado pit is far larger than the normal range of wild avocado pits. This, coupled with the fact that some of the amaranth seeds of Area B were red in color, suggests that man was selecting aberrant seeds for eating, if not for planting.

Activity Area D was located in front of the western rockfall, between the W9 line and the W4 line and

from N4 almost to S2. This area contained most of the deer remains found in the western half of the site. The assemblage of tools from Area D included a Lerma point, choppers, end-scrapers, scraper-planes, a bifacially-worked blade, and various grinding stones. These tools were associated with a fire pit (Feature No. 45), as were the remains of small animals, such as fish, and the racerunner lizard. Perhaps this represents the main cooking, food preparation, skin preparation, and flint-knapping area of Occupation 14. Side- and end-scrapers were found to the southwest of the western rockfall in the area between N2 and S2 from W5 to W9. Both side- and end-scrapers and deer remains were found in this area. Again, the milling stones and mullers may indicate basically a plant-processing area, although we found no plants in it.

Activity Area E was situated in the northwest corner of the excavated area between W9 and W5 from N3 to N6. Choppers, scraper-planes, a blade fragment, side- and end-scrapers, and metate and milling-stone fragments were found here. A single deer bone plus the jaw of a cottontail were associated with these. It is possible that this concentration of materials was not an activity area at all, but, rather, since it was on the downward slope, it may represent a refuse dump.

Another activity area was located behind the central rockfall and up against the back wall of the shelter. Labeled Activity Area G, it lay between the 0 east-west line and S2 extending from E2 to E6. Two features, a storage pit (No. 73) and a cache pit (No. 38), were located in this area. Near the second were remains of *Setaria*, grass, mesquite, and *Opuntia* seeds, and *Agave* leaves. An Abasolo point was found in Square S2E4. The other artifacts from this area were choppers, a biface, a gouge, a side-scraper, muller, metate, and mortar fragments, and several cores and chips. The grinding stones, and the seeds of the various types of cactus and grass, together hint at seed preparation. However, the assortment of tools, with a single deer bone among them, does not constitute a well-defined activity locus; and it is probable that Activity Area G was simply a storage and refuse area.

Two Carbon-14 dates were taken. One, for the eastern Occupation No. 13, was 6425 ± 275 B.C. (I-769), while the western Occupation No. 14 was dated 6600 ± 250 B.C. (I-461) (*Radiocarbon* 11: 89, 92). We would estimate both occupations fell sequentially within the period roughly between 6600 and 5900 B.C.

The Way of Life of Zone XVII

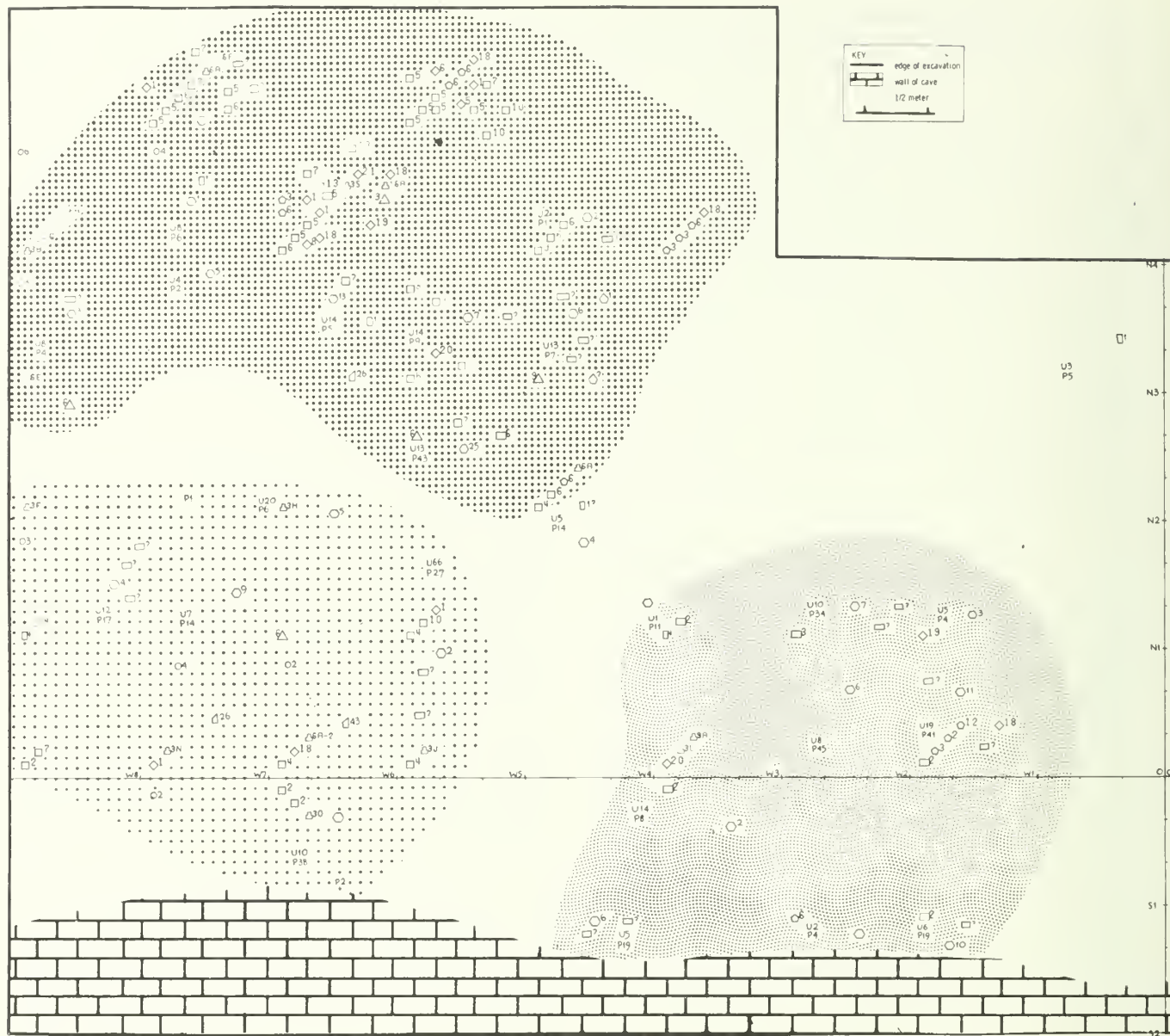
Zone XVII (Floor 8) was restricted to the western third of the site at approximately W1 extending to

W9. It was a dark brown ash band capped by a thin charcoal floor. A rockfall occurred in the zone, centered around N1W6. Most of the artifacts were spread in a rough crescent north and east of this rockfall, but a small proportion was found to the southwest (Fig. 110). The size of the area covered by the artifacts indicates a Microband Occupation No. 15; the remains of rapidly decaying cosahuico and chupandilla, which reach fruition in the fall, point to an occupation of that season. Further, these fruits occurred in both Activity Areas A and B (in Vol. I, combined under R of Tc 272), suggesting the refuse of a single group; and the similarity of artifacts of Area C to those of the other areas suggests it belonged to the same occupation.

Although the materials in this zone were fairly evenly scattered over the relatively concentrated area of the living floor, it is possible, on the basis of distribution of artifact types, to suggest three major activity areas for Zone XVII. The animal remains do not coincide very neatly with these clusters; instead, they seem to fall generally at the edges of the activity areas.

Activity Area A, lying generally to the southwest of the rockfall from N2 to S1 and W6 to W9, was distinguished by its concentration of end-scrapers. The tool kit contained 8 end-scrapers and a scraper-plane; also, a Flacco point, a crude blade, and mortar and muller fragments. There was some bone in this area, mainly badly-smashed splinters, but a whole deer humerus did occur. There also were a chupandilla pit and a cosahuico pit, as well as many chips. While flint-knapping and food preparation probably occurred here, the large number of end-scrapers suggested that hide-working may have been a chief industry.

Area B perhaps was the general living area of the floor; it was found to the north of the rockfall, generally between N2 and N6 from W3 to W9. The tool kit of this area was made up of both end- and side-scrapers, mortars, pestles, milling-stones, mullers, and metates, and included a rather dense concentration of scraper-planes. Hidalgo and Abasolo projectile points, along with the cores and flakes, occurred in the southern part of this activity area. Some animal bones were found, but the majority were confined to a narrow strip west of and apart from most of the artifacts. The bones were of a deer, an opossum, and a rabbit. While the opossum and rabbit indicate trapping, the Abasolo, Flacco, and Hidalgo points with deer bones suggest that hunting was the more important activity. The choppers and scrapers probably indicate that the meat of these animals was prepared here, while the end-scrapers associated with them hint at skin preparation.



Fall microband occupation 15

Activity Area A

- Hunting, trapping, plant collection, and food preparation
- 6 Flacco
- 3F metapodial, white-tailed deer
- 3H astragalus, white-tailed deer
- 3J tibia, white-tailed deer
- 3N radius, white-tailed deer
- 30 humerus, white-tailed deer
- 6A other, cottontail
- 1 mortar fragment
- 18 muller or mano fragment
- 26 cyrtocarpa procera (chupandilla)
- 43 sideroxylon cf. tempisque (cosahuicol)
- 0 number of unidentified bone fragments per square
- Hide-working
- 4 crude blade, prepared platform
- 2 crude, keeled end scraper
- 4 crude, long, flat-flake end scraper
- 7 multifaceted scraper-plane
- 10 crude, discoidal end scraper
- 7 side scraper fragment
- Flint knapping
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Activity Area B

- Hunting and butchering
- 3 Abasolo
- 6 Flacco
- 9 Hidalgo
- 38 other, white-tailed deer
- 3D vertebra, white-tailed deer
- 30 petrous bone, white-tailed deer
- 35 teeth, white-tailed deer
- 6A other, cottontail
- 6E innominate, cottontail
- 6F ulna, cottontail
- 6H humerus, cottontail
- 16A fragment, opossum
- 7 side scraper fragment
- 5 thick flake side scraper, two edges retouched
- 6 thick flake side scraper, one edge utilized
- 3 flake chopper
- 6 ellipsoidal chopper
- 17 crude blade fragment
- 0 number of unidentified bone fragments per square

Plant collecting and preparation

- 1 mortar fragment
- 5 flaring rim mortar
- 6 conical pestle
- 8 long, rectangular pestle
- 18 muller or mano fragment
- 19 metate fragment
- 20 boulder metate-milling stone
- 21 ovoid muller
- 5 domed scraper-plane
- 6 flat-topped scraper-plane
- 7 multifaceted scraper-plane
- 26 cyrtocarpa procera (chupandilla)
- Skin preparation
- 4 crude, long, flat-flake end scraper
- 8 gouge
- 9 thin-flake end scraper
- 10 crude, discoidal end scraper
- 13 fine, ovoid, plano-convex end scraper
- Flint knapping
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Activity Area C

- Wood working
- 4 crude blade, prepared platform
- 7 side scraper fragment
- 2 spokeshave-like tool
- 3 flake grave
- 2 slab chopper
- 3 flake chopper
- 6 ellipsoidal chopper
- 12 thin, crude, ovoid biface
- Food preparation
- 3L innominate, white-tailed deer
- 9A fragment, fox
- 18 muller or mano fragment
- 19 metate fragment
- 20 boulder metate-milling stone
- Flint knapping
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Fig. 110. Activity areas of Zone XVII of Tc 50, with a key to their artifacts and ecofacts.

Still, the many scraper-planes, the mortars, pestles, and other grinding stones all suggest that plant collecting and plant food preparation was as important as any of the other activities. Again, flint-knapping may have been undertaken.

Area C lay east of the rockfall, between W1 and W5, N2 and S1. It was characterized largely by the presence of certain types of side-scrapers and by the absence of end-scrapers and scraper-planes and other kinds of side-scrapers. A biface and several choppers were found, and one blade, mano and metate fragments, and a milling-stone were found in the northern part of the area. Scant animal remains and no projectile points occurred. Of the side-scrapers, four were spokeshaved side-scrapers, and one a flake graver. These tools suggest woodworking occurred here, along with the preparation of plant remains for food, and flint-knapping.

Although food processing and subsistence activities may be represented to some extent in all the areas, the distinctiveness of each area as a center of certain activities—skin-scraping and flint-knapping in Area A, plant-processing and butchering in B, and woodworking in C—suggests this was a home-base encampment in which the biologic population together performed a relatively wide range of semi-specialized economic and technological activities. It seems probable that individual members of this possible family group undertook special tasks; thus we would postulate a division of labor based upon sex, and perhaps age, at this time.

Since the artifacts of this zone were extremely similar to the overlying El Riego component, Zone XVI, which was Carbon-14-dated, we have estimated that this fall microband encampment (Occupation 15) occurred between 6000 and 5700 B.C.

The Way of Life of Zone XVI

Extending over the entire area of the excavation, interrupted by two large rockfalls at W7 to W8, and N2E2 to N2E4, Zone XVI was one of the most extensive living floors (Floor 9) uncovered in the excavation of the cave (Fig. 111). The stratum consisted of a gray ash layer with a thin vegetal floor cap.

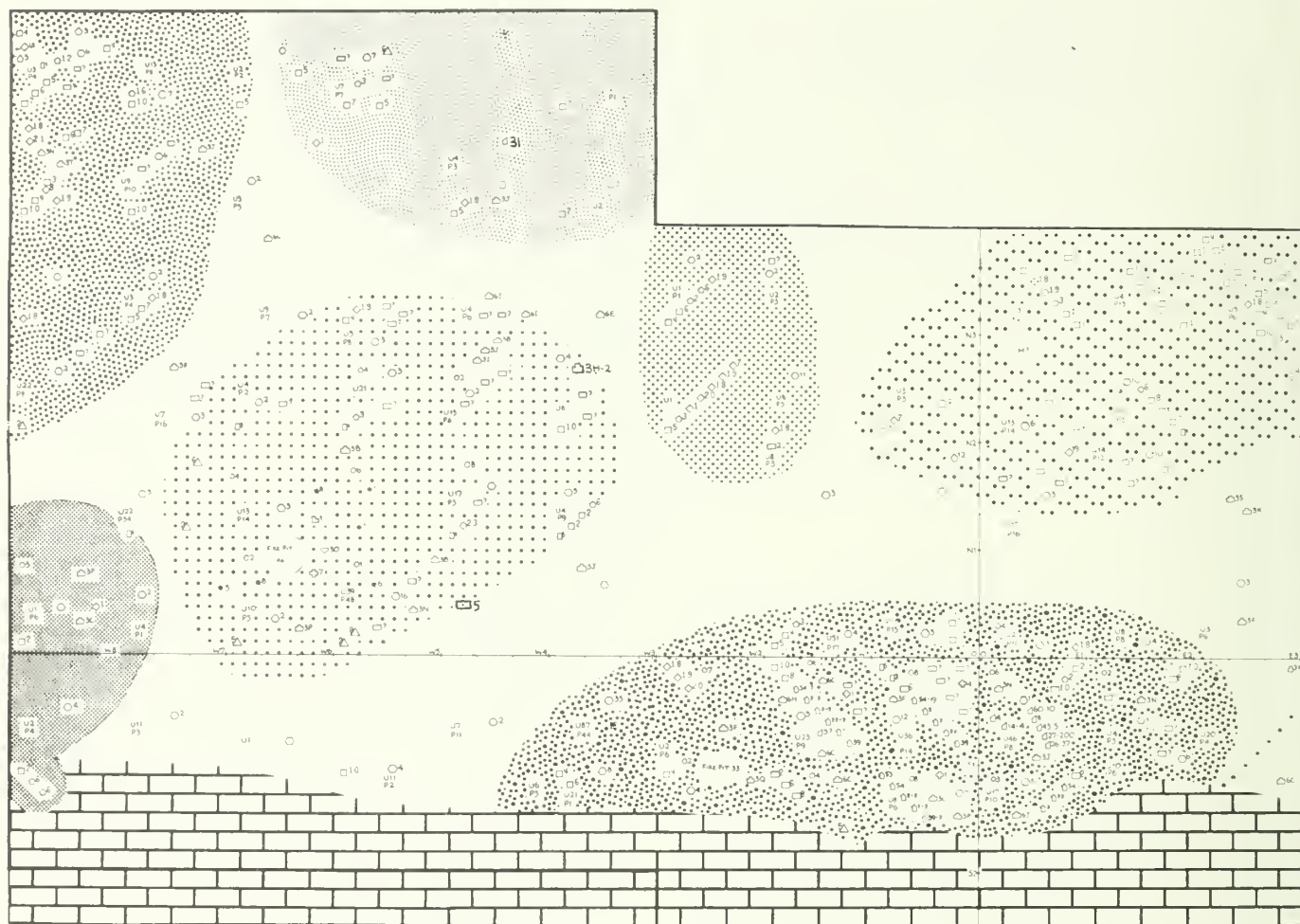
There was a difference of about 2 meters in elevation between the west and east ends of the occupation floor. It ran fairly level from W9 over to about E1; then dropped over a meter from E1 to E5 from which point it gradually sloped downward another meter between E5 and E15.

A total of 478 measurable artifacts were recovered from the whole floor. These included the usual array

of stone artifacts, but, for the first time in the preservation of artifactual material at the rock shelter, wood and fiber, small fragments of rope and string, polished and sharpened sticks, and one bundle foundation basket appeared in the assemblage. These preserved organic artifacts were largely concentrated in the area around the western rockfall, suggesting that this was a central area (designated Area D) of occupation for the activity areas nearby. On the basis of the clustering of artifacts, bones, and plant remains, several activity areas are suggested and have been labeled Areas A–I; furthermore, on the basis of their seasonality and distribution, we postulate two separate occupations on the floor, a western group (Areas A–G) and an eastern group (Areas H and I).

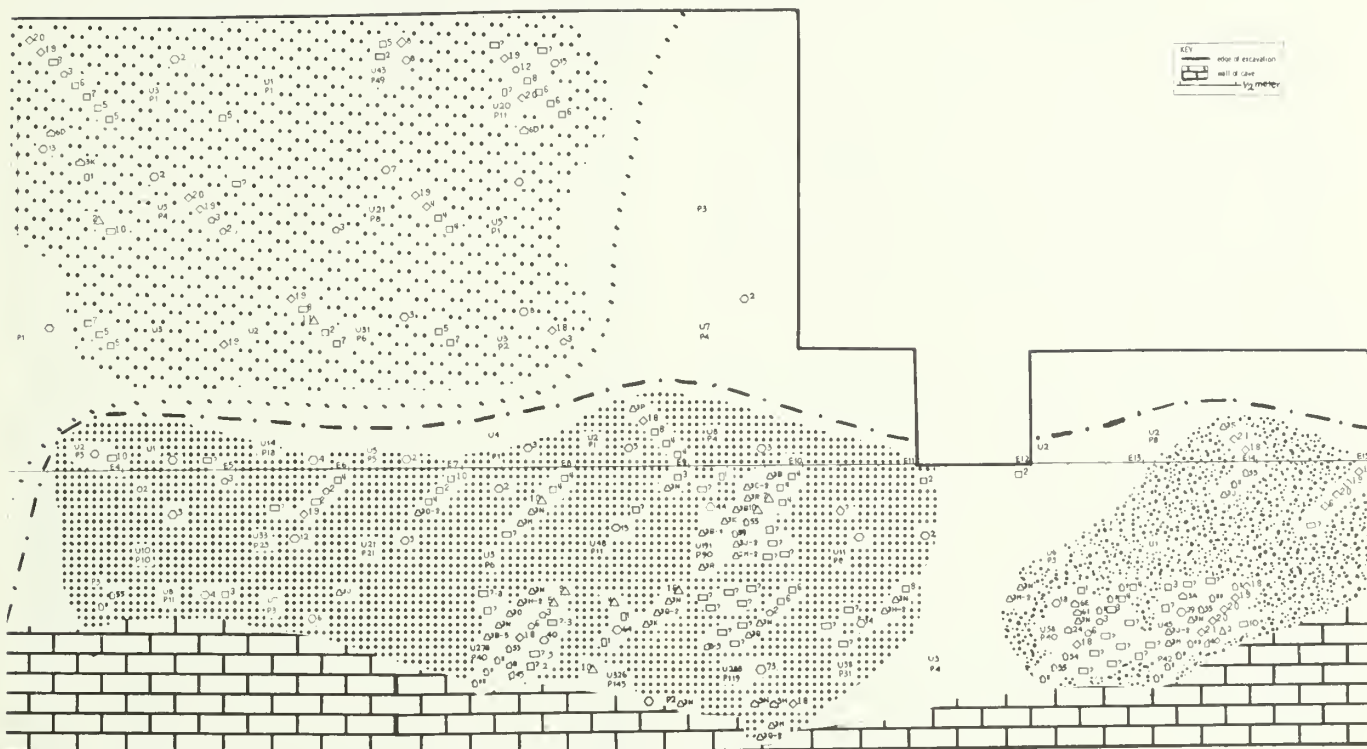
The animal bones give evidence indicating that the eastern portion of the site (Areas H and I) was occupied during the summer and fall, as bones of lizard and a few fetal deer were found in direct association with fall fruits. The lizard and fetal deer belong to a May to September period, while the cosahuico fruit are of September to November. This part of the floor contrasts with the western two-thirds of the site, which may have been occupied mainly during the dry season. Hardened antler was found in Area A; plant remains included mainly fall fruits, such as ciruela, chupandilla, cosahuico, avocado, as well as possible corn, and *Opuntia* seeds of the winter in Area F; Areas B, E, and G lacked entirely animal remains of the wet season. It is possible that a large group occupied this entire area during the dry season, with only a small number of them remaining in the east and during the wet season, as indicated by Activity Areas H and I.

We shall first consider the larger Occupation 16 of the west end in terms of its activity areas. Here, in addition to there being 2 fireplaces (Nos. 33, 46) and a possible charcoal patch in Square N2E1, 7 activity areas seemed to extend beyond the northern and western limits of our area of excavation. Perhaps a number of families were living together during this period. Activity Area A in the northwest corner of the floor, between N3 and N6 and W7 and W9 was defined by a dense concentration of scraper-planes and end-scrapers, in the midst of which were also a projectile point and a few deer bones. The artifacts, mostly scraper-planes and end-scrapers, but including several grinding stones, were clustered in Squares N4W8 and N5W8. A negative criterion for distinguishing Activity Area A was the paucity of blades and side-scrapers and the absence of cottontail remains. The presence of the particular artifact types signals hide preparation first, and second, the processing of



Fall - winter macroband occupation 16 - A-G											
Activity Area A		Activity Area B		Activity Area D		Activity Area E		Activity Area F			
Hunting activities		Hunting activities		Hunting and trapping		Flint knapping		Hunting and trapping		Plant collecting and food preparation	
2 Lerna		6 Flacco		2 Lerna		cores		5 El Riego		18 muller or mano fragment	
3 tibia, white-tailed deer		31 radius, white-tailed deer		5 El Riego		U number of flakes without platforms per square		3C rib, white-tailed deer		19 metate fragment	
3N radius, white-tailed deer		Plant collecting and preparation		6 Flacco		square		8 metapodial, white-tailed deer		20 boulder metate-milling stone	
3T antler, white-tailed deer		1 mortar fragment		8 Tortugas		P number of flakes with platforms per square		31 tibia, white-tailed deer		5 domed scraper-plane	
Butchering and skin preparation		18 muller or mano fragment		38 other, white-tailed deer		Weaving and string making		3N radius, white-tailed deer		6 flat-topped scraper-plane	
3 crude, ovoid, plano-convex end scraper		5 domed scraper-plane		31 calcaneum, white-tailed deer		1 4-ply coarse rope, 2-twist agave yarn		3P scapula, white-tailed deer		2 setaria cf. macrosclachya	
4 crude, long, flat-flake end scraper		7 multifaceted scraper-plane		31 tibia, white-tailed deer		5 2-ply coarse cord, 5-twist agave yarn		30 pelvis bone, white-tailed deer		3 unidentified grass seed	
10 crude, discoidal end scraper		7 side scraper fragment		3N radius, white-tailed deer		6 2-ply coarse cord, 2-twist agave yarn		6C tibia, cottontail		4 grass quids	
3 flake chopper		3P scapula, white-tailed deer		3P scapula, white-tailed deer		8 2-ply coarse cord, 5-twist bast yarn		6H humerus, cottontail		57 xanthoxylum	
1 flake chopper		3 flake chopper		3P metapodial, white-tailed deer		1 overhand knot, agave fiber		6I maxilla, cottontail		8 persea americana (avocado)	
12 thin, crude, ovoid blade		cores		6C tibia, cottontail		7 spine pin		Butchering and skin preparation		18 lucania esculenta	
16 thin, fine blade		U number of flakes without platforms per square		6E innominate, cottontail		30 noninterlocking stitch coiled basket		3 flake graver		20 prosopis juliflora seeds (mesquite)	
1 crude blade fragment		P number of flakes with platforms per square		6I ramus, mandible, cottontail				5 crude blade, pointed platform		26 cyrtocarpa procera (chupandilla)	
7 side scraper fragment				Butchering and skin preparation				2 end scraper fragment		27 spondias mombin (toronja)	
cores				3 crude blade, unprepared platform				4 crude, long, flat-flake end scraper		39 opuntia spp. seeds (prickly pear)	
U number of flakes without platforms per square				4 crude blade, prepared platform				8 gouge		40 opuntia spp. fruit (prickly pear)	
P number of flakes with platforms per square				5 crude blade, pointed platform				10 crude, discoidal end scraper		43 sideroxylon cf. tempisque (cachaui)	
				2 crude, keeled end scraper				7 side scraper fragment		54 agave spp. quids	
				4 crude, long, flat-flake end scraper				6 thick flake side scraper, one edge utilized		55 agave spp. leaves	
				10 crude, discoidal end scraper				10 thin flake side scraper, one edge retouched		60 braided ducis (palm)	
				3 flake chopper				2 slab chopper		Flint knapping	
				6 ellipsoidal chopper				3 flake chopper		cores	
				0 number of unidentified bone fragments per square				0 number of unidentified bone fragments per square		U number of flakes without platforms per square	
				Plant collecting and preparation				P number of flakes with platforms per square		P number of flakes with platforms per square	
				19 metate fragment				0 number of unidentified bone fragments per square		Wood working	
				23 ovoid mano						2 spoon-shaped-like tool	
				5 side scraper fragment						8 thin flake side scraper, one edge retouched	
				5 thick flake side scraper, two edges retouched						1 polished stick	
										4 small pointed sticks	

Fig. 111. Activity areas of Zone XVI of Tc 50, with a key to their artifacts and ecofacts.



Summer - fall microband occupation 17 H-1

- Activity Area G**
- Hunting and trapping
 - 2 Lerna
 - 11 La Mina
 - 36 lemur, white-tailed deer
 - 60 lemur, cotton-tail
 - Food preparation and/or butchering and/or skin preparation
 - 1 crude blade fragment
 - 4 crude blade, prepared platform
 - 1 crude, keeled end scraper
 - 4 crude, long, flat-flake end scraper
 - 10 crude discoidal end scraper
 - 7 side scraper fragment
 - spoke-shave-like tool
 - 1 flake graver
 - 4 thick flake side scraper, one edge retouched
 - 8 thin flake side scraper, one edge utilized
 - 10 thin flake side scraper, one edge retouched
 - 2 slab chopper
 - 2 flake chopper
 - 6 ellipsoidal chopper
 - 12 thin, crude ovoid biface
- Plant processing**
- 4 cylindrical pestle
 - 7 hemispherical pestle
 - 8 long, rectangular pestle
 - 18 muller or mano fragment
 - 19 metal fragment
 - 20 boulder metal-milling stone
 - 7 end scraper fragment
 - 1 scraper-plane fragment
 - 5 domed scraper-plane
 - 6 flat-topped scraper-plane
 - 7 multifaceted scraper-plane
 - 8 gouge
- Flint knapping**
- cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
- Activity Area H**
- Hunting activities
 - 4 Plainview
 - 5 El Riego
 - 7 hogues
 - 9 Hidalgo
 - 10 Trinidad
 - 16 Coccatlan
 - 36 other, white-tailed deer
 - 36 rib, white-tailed deer
 - 36 asragalus, white-tailed deer
 - 33 tibia, white-tailed deer
 - 36 femur, white-tailed deer
 - 36 ulna, white-tailed deer
 - 36 radius, white-tailed deer
 - 30 humerus, white-tailed deer
 - 39 scapula, white-tailed deer
 - 30 petrous bone, white-tailed deer
 - 36 ramus, mandible, white-tailed deer
 - Butchering and skin preparation
 - 7 end scraper fragment
 - 2 crude, keeled end scraper
 - 3 crude, ovoid, plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 8 gouge
 - 10 crude discoidal end scraper
- Activity Area I**
- Hunting activities
 - 2 Lerna
 - 3A foetus, white-tailed deer
 - 33 tibia, white-tailed deer
 - 36 ulna, white-tailed deer
 - 36 radius, white-tailed deer
 - 35 teeth, white-tailed deer
 - 46 innominate, cotton-tail
 - 41 ramus, mandible, cotton-tail
 - Butchering and skin preparation
 - 1 scraper-plane fragment
 - 3 crude, ovoid plano-convex end scraper
 - 4 crude, long, flat-flake end scraper
 - 3 flake chopper
 - 6 ellipsoidal chopper
 - 7 side scraper fragment
 - 3 flake graver
 - 10 thin flake side scraper, one edge retouched
- Plant collecting and preparation**
- 6 conical pestle
 - 18 muller or mano fragment
 - 19 metal fragment
 - 20 boulder metal-milling stone
 - 21 ovoid muller
 - 2 setaria cf. macrostachya
 - 3 unidentified grass seed
 - 20 prosopis juliflora seeds (mesquite)
 - 40 opuntia spp. fruit (prickly pear)
 - 43 sideroxylon cf. tempsique (cassahuate)
 - 54 agave spp. quids
 - 55 agave spp. leaves
- Flint knapping**
- cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square
- Plant collecting and preparation**
- 18 muller or mano fragment
 - 19 metal fragment
 - 20 boulder metal-milling stone
 - 21 ovoid muller
 - 2 setaria cf. macrostachya
 - 3 unidentified grass seed
 - 20 prosopis juliflora seeds (mesquite)
 - 40 opuntia spp. fruit (prickly pear)
 - 43 sideroxylon cf. tempsique (cassahuate)
 - 54 agave spp. quids
 - 55 agave spp. leaves
- Flint knapping**
- cores
 - U number of flakes without platforms per square
 - P number of flakes with platforms per square

plant and animal remains, as the activities performed in this area. Several other areas of concentration could be discerned within the region, lying north of the 0 line and extending from W2 to W8, that were difficult to define in terms of boundaries. While the areas were separable in terms of their artifact concentrations, the distribution of animal remains blurs these divisions and areas together.

Activity Area B was an area covering 4 square meters roughly from W6 and from N4 to the edge of excavation. It contained primarily scraper-planes, but also a winter cardon cactus fruit, a chopper, and a Flacco projectile point. A single deer tibia was found in Square N4W4. This area lacked blades, substantial bone remains, and end-scrapers, and had few chips. The evidence again points to vegetal food preparation and hunting.

Activity Area C covered 2 square meters, N2W2 and N3W2, just southeast of Area B. Since the area intermediate between the two was not excavated, it is possible that these two areas blended into each other. Activity Area C was defined by the dense distribution of choppers, scraper-planes, and fragments of mortars, manos, and metates. There were no animal bones in this area and no projectile points. Some remains of Audubon cottontail were found just to the west of this limited activity area. The mortar, mano, and metate fragments in the area may relate to the distribution of mortars and other grinding tools already noted to the west of Area C, that is, throughout Areas A and B. Area C seems to have been involved in plant preparation. It may well be that Areas A-C represent the activity areas peripheral to the general living area, D.

Activity Area D covered about 8 square meters, extending from W3 to W7 between the 0 east-west line and the N3 line. The central squares of this area contained sparse artifact remains. A fire pit (No. 46) was located in N1W6. The squares nearest this fire pit contained cord and a basket, as well as 5 projectile points, all lanceolate forms. This was the heaviest distribution of projectile points in the western portion of the floor. Deer remains were found in association with the points, so it would seem these people hunted. A few rabbit bones may imply trapping. For the rest, Area D contained blades and bifaces scattered through the northern half of the area. Four blades were found, one of them associated with deer remains. The bifaces were choppers. These artifacts evidence, probably, butchering and meat-food preparation. Area D contained no scraper-planes, in contrast to Areas A, B, and C to the north, and had no mortar fragments, but it did have a fragment of a metate and an ovoid mano,

which indicate some grinding of plants. In addition, end-scrapers were found in this area, and may indicate hide working. There were a fair number of cores and chips, the products of flint-knapping.

Perhaps the most interesting activity which we have evidence of from this area was string-making and basket-making. A basket was found constructed of coils made of bundles of grass and strands of *Agave* woven through them in a non-interlocking manner from lower left to upper right; perhaps the spine pin served as a weaving tool. The roughly conoidal basket would originally have measured about 30 cm. in diameter, and about 15 cm. in depth. It would have been an excellent container for seeds. Comparisons of this basket with baskets from the Southwest and Peru show that this is a far earlier example of coiled basketry than has occurred in those areas. Perhaps the technique of making coiled baskets diffused both north and south out of Mesoamerica along with seed agriculture (see Vol. 2 of this series, Chap. 11).

Associated with the basket were pieces of 4-ply rope and pieces of 2-ply cord made from yarns that were both S-twisted and Z-twisted, mainly of *Agave* fiber, but with 2 examples of bast yarn. There was also an overhand knot of *Agave* fiber. All these varieties of string, and the basket itself, seem to indicate that there had been a long tradition of string-making and weaving, despite the lack of evidence of such in earlier levels.

Activity Area E covered Squares S1W8 and W8. It might have been included as part of Activity Area D, for the deer remains were scattered continuously across these two areas. In this small area near a rock-fall at the back wall were 2 choppers, 2 end-scrapers (both crude, keeled and snub-nosed, which is the same type as appeared in Area D), a blade, and a mortar fragment. There were no projectile points in the area nor any side-scrapers. This small area, apparently peripherally related to Area D, may also have been the locus of plant and meat-food preparation, like Areas A, B, and C.

Activity Area F was a much larger area covering about 12 square meters between roughly E2 and W4, and north of the 0 line to S2. More or less central within the area was Feature No. 33, a fire pit. Deer and Audubon and Mexican cottontail remains were scattered. There was a notable lack of projectile points for such an extensive area; a single El Riego point was found at the back wall. The predominating artifacts were the side- and end-scrapers of various types. There were also found blades, scraper-planes, chopper bifaces, and muller, metate, and milling-stone frag-

ments in this area, as well as *Agave* quids, a possible corn leaf, ciruela, chupandilla, cosahuico, avocado pits, amaranth (possibly domesticated), *Opuntia* seeds, and 3 polished sticks, one small and pointed. Area F, like Area D, seemed to represent a general living area. Both D and F had evidence of hunting, trapping, butchering, and skin preparation, as well as plant collecting and preparation. Area F had stronger evidence of flint-knapping and woodworking than Area D, but lacked any sign of weaving and string-making activities, peculiar to D.

The northeastern edge of Area F skirted the central rockfall and would appear to blend with Area G, north and west of the central rockfall. However, on the basis of the presence of many more scraper-planes, scrapers, and grinding-stones in Area G than in F, and the relative lack of animal bones in Area G as compared with Area F, we have kept these areas separate.

Area G, the largest activity area in the zone, covered about 19 square meters, extending from W1 to E8 and from N1 to N4. It included the northern half of the central rockfall, and contained a thick patch of charcoal located in Square N2E1. The predominant type of artifact in this area was the scraper-plane (26 were found). Of ten concentrated in 3 square meters, 6 were contained within a 1-meter square. End- and side-scrapers were also in quite abundant evidence. The heaviest concentration of these occurred in Squares N3E1 to N3E4 and in Squares N1E6 to N2E7, with no particular type dominating. The concentration of 6 side- and end-scrapers in Squares N3E1 to N3E4 coincided with the heaviest distribution of scraper-planes. Whether these were used in hide or food preparation or both is difficult to determine. Pestles and grinding-tool fragments were scattered from end to end through the area. For the most part, the pestles were found in its eastern portion; these testify to the processing of plants. There were scant animal remains in Area G; a couple of bones of deer and of Audubon cottontail occurred in Squares E3, N1E3, and N3E4. These faunal remains were in proximity to the major concentration of scraper-planes and end- and side-scrapers, which suggests right away some sort of butchering activity. Again, in contrast to Area F, the projectile points recovered from Area G were a Lerma and a La Mina point; like F, however, G seemed to represent a wide variety of activities, with plant collecting and processing dominant, but with some evidence of skin preparation and butchering, flint-knapping, and a little hunting and trapping.

Now we shall look at the other Occupation 17, represented by Activity Areas H and I, as a summer-fall

stay by a much smaller group, at best a microband. Activity Area H extended from E4 to E11 between S2 and N1, covering about 13 square meters. It is defined primarily by the distribution of projectile points, chips, cores, and end-scrapers (and many animal remains). The deer bones not only belonged to deer of different ages and of two sexes, but also included bones from every part of the deer. Chopper bifaces, blades, and side-scrapers were also numerous, and there seemed to be little doubt that butchering took place here. The 8 projectile points recovered from this activity area were of the Trinidad, Hidalgo, El Riego, Nogales, Coxcatlan, and Plainview types. All of these were concentrated in 4 square meters between E7 and E10, S2 and 0. The predominant form of end-scraper was the crude, long, flat-flake end-scraper. There were some plant remains and animal bones associated with these, hinting at skin-working. With reference to the activity areas discussed previously, this one is unique in that it contained barbed-type projectile points (Coxcatlan, Hidalgo, and Trinidad). This was definitely an encampment related to the hunt where butchering, skin preparation, and flint-knapping were undertaken, and only a minor interest was taken in plant collection and preparation.

Area I was the easternmost activity area, a limited one covering 4 square meters diagonally between S2, E12, and E15, with the heaviest concentration of artifacts confined to two squares, S2E13 and S2E14. It may have been just an extension of Area H, although there seemed to be a gap between them. This gap was void of artifacts, although some deer bones were found in that portion. Area I contained varied remains: 1 coprolite, 3 end-scrapers, plus fragments, side-scraper and flake graver, and many fragments, 2 chopper bifaces, a pestle, mullers, manos, metates, many flakes, and cores. There were also some animal remains, both deer and cottontail. The array of plants found here, as well as the grinding-stones, set Area I apart from Area H. Although butchering probably took place in both areas, Area I seemed oriented to plant collection and preparation and thus complemented Area H whose concern was with animals and flint-knapping.

We have distinguished this eastern occupation from the one to the west by the size of the group that could have occupied it and by the time of year it was occupied; it can be further distinguished by its apparent purpose, or general nature. Most of the deer were recovered from the eastern end of the site, and the presence of end-scrapers and projectile points associated with those concentrations of deer and rabbit remains suggested microband hunting camp activities, includ-

ing a large amount of local butchering. The grass and *Setaria* seeds, wild avocado, domesticated chili, and avocado pits indicated that both plant collecting and incipient agriculture were practiced by this group. The grinding-stones indicated plant-food preparation, and the choppers and various scrapers associated with cracked bones revealed some meat preparation at the same time. The end-scrapers may have meant skin-scraping. Calculation of quantity of foodstuffs shows that the diet of the occupants of the east end was very different from that of the west end, with 63 percent of it coming from the 6 deer that were hunted, 2 percent from the 6 rabbits trapped, 32 percent from the seeds and fruit collected, and perhaps 3 percent from crops planted. Analysis of the one feces found shows a similar picture. *Setaria*, mesquite, and meat were found in it.

This contrasts with the diet of the dry-season occupants of the west end, 66 percent of which came from a wide variety of plants collected and stored in the fall, such as the fruits and *Opuntia*. Meat from the 3 deer and 4 rabbits, for which there is evidence, would have yielded only 34 percent of their sustenance. The one lone reddish amaranth seed and the single possible maize leaf may have represented the last bit of surplus of the planted crop harvested earlier, since consumed. In fact, one might speculate that their food production was very poor and that they were living off surpluses obtained in earlier lush seasons, either by them or by the family that lived in the east end in the summer—perhaps in the west sponging relatives came to dinner and stayed through the dry season.

As for the other activities, comparison of the artifacts of the two occupations suggested the macroband group to the west was engaged in many more activities than were the eastern microband occupants. Aside from subsistence activities, food preparation and skin-scraping, there was the additional evidence of flint-knapping and woodworking. The cord and overhand knot of maguey indicated string-making, and the basket fragment, weaving. It would seem that, for those in the west end, having surplus food to eat made for a much fuller life.

Two Carbon-14 dates place the occupations at 5625 \pm 195 B.C. (I-675, I-574) (*Radiocarbon* 11: 90, 92) and the many artifacts classify them as components of the late El Riego cultural phase.

The Way of Life of Zone XV

Occupational debris and ash deposits were found

over the entire area of excavation in a recognizable floor, which has been labeled as Floor 10 of Zone XV. The highest stratum level was found between 0 and W3 from the S2 to the 0 east-west line. From this point the floor sloped in all directions with the greatest slope to the east, where there was a difference of 2 meters at the lowest point at the E15 line. The stratum was gray-brown in color, turning to yellow in the extreme eastern portions of the area excavated. A thin brown floor covered this lower area, and most of the artifacts came from it (Fig. 112).

Two hundred and fifty-two measurable stone artifacts and many ecofacts were found scattered throughout the zone. Their distributions provided a basis for defining 9 activity areas, lettered A through I. Area D, because of a peccary fetus indicative of a dry-season occupation, dove remains, distinctive Coxcatlan projectile points, and many flint chips and small animal bones, stands out in sharp contrast to the others. Activity Area F contained mesquite, *Setaria* of the spring, amaranth, avocado of the fall, and the jaw of a deer evidencing the summer season. Area C had summer-fall chupandilla and ciruela fruits; Area H contained a deer fetus belonging to the wet season; and Zone I had mesquite and *Setaria* seeds of the spring, as well as a deer fetus, and amaranth of the summer. Areas B, E, and H contained splinters of bone that may have come from summer deer fetuses. Even Area G included a seasonal indicator—the mere fragment of a maize leaf. Although there is some basis (poor seasonality) for separating Areas G and H from the others, it is believed that all areas of the zone, save D, represent a single macroband occupation which lasted from the spring through the fall.

We shall first consider the smaller winter microband occupation, represented on this floor solely by Activity Area D, located to the north of a rockfall, between Squares N1E1 to N1E4 and extending to N3. D covered an area between W2 and E5, from N2 to at least N4 at the edge of excavation. H contained the remains of many small animals, including Audubon cottontail, peccary (a fetus), quail, and dove, which was in contrast to the quantities of deer remains from several of the other areas. Two Coxcatlan points, many end-scrapers, and scraper-planes came from Area D, as well as mortars, manos, and metates. This looked like a short visit by a small group of hungry trappers who had in the dire dry season visited the cave, and, while there, ground up seeds, prepared plant and animal foods, chipped a few tools, worked some wood, and then left.

Although it is possible that the remaining activity areas could have represented a series of visits by microbands engaged in different activities during the wet season, it seems more probable to us that just one occupation is represented and that it lasted from the spring on into the fall. This macroband Occupation 19 undertook a wide variety of interrelated activities in various parts of the cave floor.

Activity Area A occurred in the northwest corner of the excavation roughly from N1 to N6 between W7 and W9; it undoubtedly extended still farther west into the unexcavated portion of the cave. Here were found end-scrapers, scraper-planes, blades, side-scraper fragments, a chopper, mortar, muller, and pestle, and a Flacco projectile point, many chips and cores, in association with two deer bones. It may have been a food preparation and skin-working area where flint-knapping also occurred.

Just east of A, toward the front of the cave, was Area B, lying between W3 and W7, from N3 to N6. While there were found here some end-scrapers, side-scrapers, and 3 projectile points of the Trinidad, Agate Basin, and San Nicolas stemmed types, very few bones occurred. Most were splintered so badly they were not identifiable. Associated with these artifacts were a hammerstone, cores, and flakes, suggesting that scrapers and points were the products of flint-knapping activities and did not evidence other activities. To complement this picture were 9 scraper-planes, 2 pestles, 2 mortars, a metate, a muller, and a milling-stone, and 4 manos. Certainly one of the major activities of this area was scraping and grinding up seeds and other collected plant food.

Activity Area C was a very small concentration centered about Square W5 and perhaps was merely an extension of Area B. It contained a biface, 2 blades, a scraper-plane, 2 side-scrapers, 3 chupandilla pits, and 1 ciruela pit, plus a number of cores and chips. A Trinidad point from the square just west of this concentration may have been associated with these, but there were no animal remains in this activity area. Exactly what activities were performed here is difficult to ascertain, but plant food preparation seems a likely possibility.

Activity Area E, including Squares W3, W2, and N1W2, was also poorly defined. It contained side- and end-scrapers, a concentration of deer remains, and Tortugas and Trinidad projectile points. Whether this was a place where a deer was butchered and processed as part of the routine of the macroband group, or represents instead the tasks of another intermittent

occupation of the rock shelter, cannot be determined with certainty, but we prefer the former hypothesis. This concentration may merely be part of the larger Area F to the east.

Activity Area F was located in the central part of the zone between W3 and E7 and S2 and N1. It contained a very large amount of deer remains, very few small mammal remains, and one human feces. The tool kit here included manos, metates, and the largest concentration of side- and end-scrapers in the whole occupation. Obviously, both animal and plant foods were processed here and possibly skins prepared. Area F also contained a cache pit (Feature 30) and storage pits Nos. 34 and 39, as well as the fire pit, Feature No. 72, all of which are signs of cooking food. These storage features were the foci of the 3 major concentrations of plant remains within this area, which included cultivated avoedo, and (wild?) maize (leaf and husk fragments); and in Pit 34 were found a fragment of a bundle foundation basket, knotted net, strands of 8 fragments of 2-ply coarse cord and 4-ply coarse rope, tied in a slip knot, and an overhand knot. The association of these remains with *Agave* quids and fiber suggests that another activity was string and textile making. Polished and cut sticks found in association with spokeshaves and gouges indicated woodworking. Moreover, many chips and cores indicated flint knapping. The Abasolo point may have been a preform. This was an area of many tasks, not confined to hunting and food processing activities, and must have been the major living area of this occupation.

Activity Area G was located in the area between E6 and E9 from N2 to N4. It is defined largely by the association of various types of bifaces, scraper-planes, side- and end-scrapers, and a single muller or pounder. A possible maize leaf was found here and no animal remains. One Trinidad projectile point occurring here was the only evidence for our placing G in this large macroband occupation. Determining the activities of this area was difficult, but one might guess they included food and skin preparation and possibly flint-knapping.

Activity Area H was of a different nature. Covering an area between E6 and E11 from S2 to N1, its tool assemblage consisted of 2 blades, a chopper and biface, several scrapers, 5 projectile points in association with animal bones (primarily deer), as well as many cores and flakes associated with both deer antler and a muller that could have been a hammer. The projectile points found in this activity area were Abasolo, Flacco, and Trinidad. It seems obvious that Area H

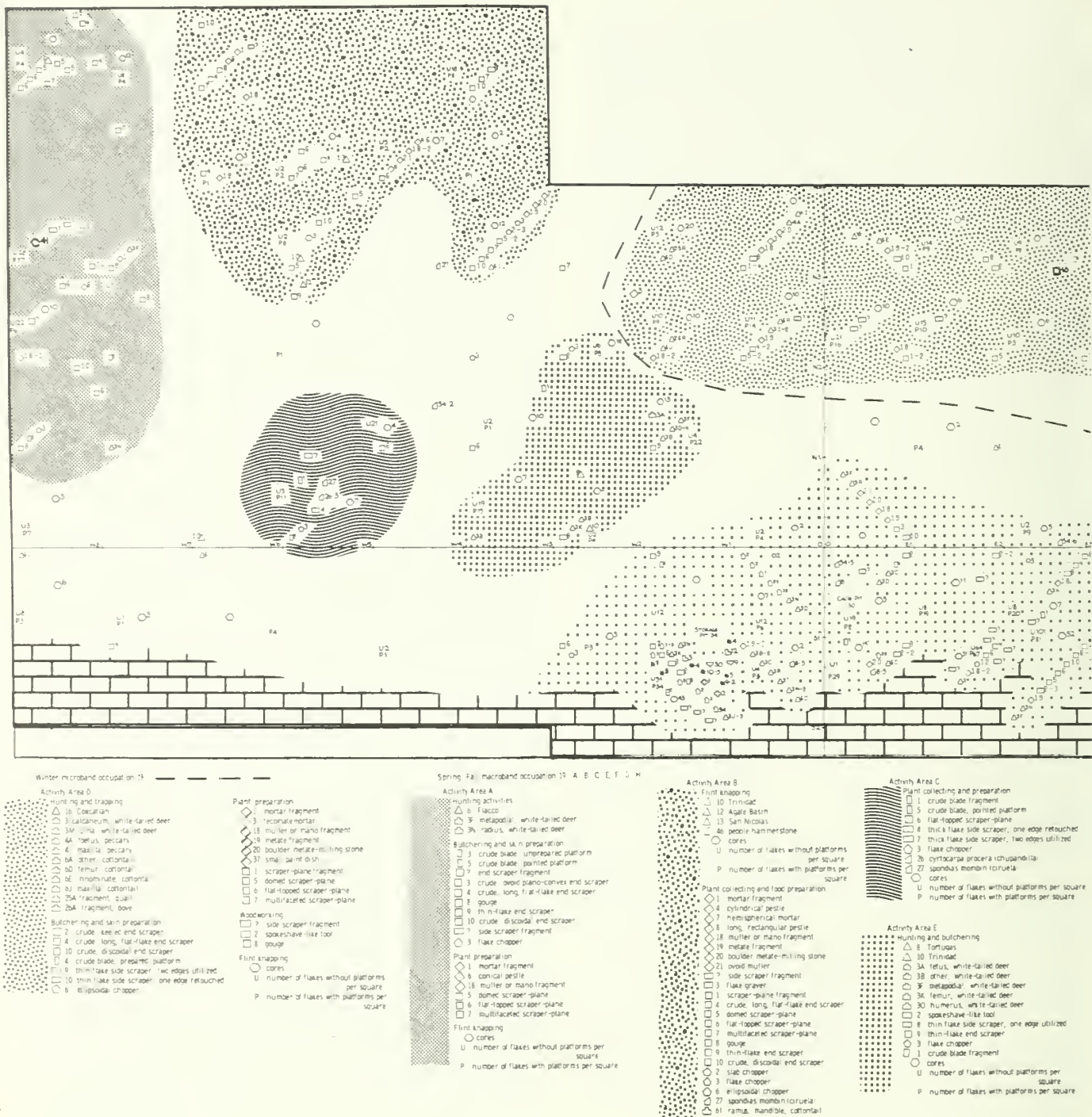
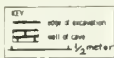


Fig. 112. Activity areas of Zone XV of Tc 50, with a key to their artifacts and ecofacts.



Activity Area F

- Butchering and skin preparation
- 3B other, white-tailed deer
- 3C rib, white-tailed deer
- 3D vertebra, white-tailed deer
- 3E metapodial, white-tailed deer
- 3J tibia, white-tailed deer
- 3K femur, white-tailed deer
- 3M ulna, white-tailed deer
- 3N radius, white-tailed deer
- 3O humerus, white-tailed deer
- 3P scapula, white-tailed deer
- 3Q petrous bone
- 3R ramus, mandible, white-tailed deer
- 3T antler, white-tailed deer
- 3C tibia, cottontail
- 3A fragment, fox
- 1 crude blade fragment
- 4 crude blade, unprepared platform
- 2 crude, keeled end scraper
- 3 crude, ovoid, plano-convex end scraper
- 1 crude, long, flat-flake end scraper
- 3 thin-flake end scraper
- 10 crude, discoidal end scraper
- 7 side scraper fragment
- 10 thin flake side scraper, one edge retouched
- 0 number of unidentified bone fragments per square
- Plant preparation
- 6 conical pestle
- 18 mortar or mano fragment
- 19 metate fragment
- 20 boulder metate-milling stone
- 21 wood muller
- 5 domed scraper-plane
- 6 flat-topped scraper-plane

- 7 multifaceted scraper-plane
- 1 don edule
- 2 setaria cf. macrostachya
- 3 unidentified grass seed
- 5 zea mays maize
- 7 amaranthus spp.
- 8 persea americana (avocado)
- 20 prosopis juliflora seeds (mesquite)
- 38 opuntia spp. leaves (prickly pear)

Flint knapping
 3 Abasco
 0 cores
 U number of flakes without platforms per square
 P number of flakes with platforms per square

- Tentile and string mending
- 9 overhand knotted net
- 30 noninterlocking stitch, coiled basket
- 1 4-ply coarse rope, 2-twist lagave
- 3 4-ply coarse rope, 2-twist bast
- 4 4-ply coarse rope, 5-twist bast
- 5 2-ply coarse cord, 5-twist lagave
- 9 2-ply coarse cord, 5-twist bast
- 10 2-ply coarse cord, 2-twist bast
- 3 overhand knot, 2-ply, 5-twist, bast-fiber string
- 12 slip knot, 2-ply, 5-twist, bast-fiber string
- 54 agave spp. quids

- Woodworking
- 8 gouge
- 7 spokeshave-like tool
- 3 flake graver
- 8 thin flake side scraper, one edge utilized
- 1 polished stick
- 2 cut stick

Activity Area G

- Food and skin preparation
- 10 Trinidad
- 1 crude blade fragment
- 2 crude, keeled end scraper
- 4 crude, long, flat-flake end scraper
- 6 flat-topped scraper-plane
- 7 multifaceted scraper-plane
- 8 gouge
- 10 crude, discoidal end scraper
- 3 flake chopper
- 6 ellipsoidal chopper
- 7 side scraper fragment
- 2 spokeshave-like tool
- 3 flake graver
- 8 thin flake side scraper, one edge utilized
- 10 thin flake side scraper, one edge retouched
- 18 mortar or poulder
- 5 zea mays maize

Flint knapping
 U number of flakes without platforms per square
 P number of flakes with platforms per square

- Flint knapping
- 3 Abasco
- 0 cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Activity Area H

- Hunting and trapping
- 6 Flacco
- 10 Trinidad
- 3A telus, white-tailed deer
- 3B other, white-tailed deer
- 3F metapodial, white-tailed deer
- 3H astragalus, white-tailed deer
- 3K femur, white-tailed deer
- 3M ulna, white-tailed deer
- 3N radius, white-tailed deer
- 3O petrous bone, white-tailed deer
- 3R ramus, mandible, white-tailed deer
- 3T antler, white-tailed deer
- 6A other, cottontail
- 6H humerus, cottontail

- Skin preparation and butchering
- 1 crude blade fragment
- 4 crude blade, prepared platform
- 7 end scraper fragment
- 2 crude, keeled end scraper
- 3 crude, ovoid, plano-convex end scraper
- 4 crude, long, flat-flake end scraper
- 1 thin-flake end scraper
- 10 crude, discoidal end scraper
- 3 flake chopper
- 12 thin, crude, ovoid blade
- 2 side scraper fragment
- 1 flake graver
- 0 number of unidentified bone fragments per square

Flint knapping
 3 Abasco
 0 cores
 U number of flakes without platforms per square
 P number of flakes with platforms per square

Plant preparation

- 1 mortar fragment
- 19 metate fragment
- 5 domed scraper-plane
- 6 flat-topped scraper-plane
- 7 multifaceted scraper-plane

Woodworking
 2 spokeshave-like tool
 8 gouge
 82 bark
 83 wood

Activity Area I

- Plant collecting and preparation
- 1 mortar fragment
- 18 mortar or mano fragment
- 19 metate fragment
- 20 boulder metate-milling stone
- 21 ovoid muller
- 2 setaria cf. macrostachya
- 3 unidentified grass seeds
- 7 amaranthus spp.
- 20 prosopis juliflora seeds (mesquite)
- 38 opuntia spp. leaves (prickly pear)
- 45 capsicum annuum (chili pepper)
- 54 agave spp. quids

Hunting and butchering activities
 9 Hidalgo
 10 Trinidad
 12 Aguila Basin
 3A telus, white-tailed deer
 3B other, white-tailed deer
 3C rib, white-tailed deer
 3D vertebra, white-tailed deer
 3E metapodial, white-tailed deer
 3F metapodial, white-tailed deer
 3H astragalus, white-tailed deer
 3K femur, white-tailed deer
 3M ulna, white-tailed deer
 3N radius, white-tailed deer
 3O petrous bone, white-tailed deer
 3R ramus, mandible, white-tailed deer
 3T antler, white-tailed deer
 3 flake graver

Flint knapping
 0 cores
 U number of flakes without platforms per square
 P number of flakes with platforms per square

was basically related to hunting and butchering and/or skinning of deer and rabbits. The tremendous number of cores and flakes with antler retouchers and hammers suggest that the second major activity was flint knapping. The Abasolo point may have been a preform. It has been suggested that this area may have represented a separate wet-season hunting occupation; however, its discrete location, the presence of the complex of projectile points, and the wet-season deer fetus and bones all seem to tie it in quite closely with the other activity areas (except Area D).

A final activity area, I, lay roughly between E11 and E15 between S2 and the 0 east-west axis. Feature No. 43, a refuse pit, occurred within it. The predominant artifacts recovered from this area were mortars, milling stones, manos, and metates. Some animal bones, largely of deer, were in this area. Agate Basin, Hidalgo, and (1) Trinidad projectile points were found. This area also included one of the largest concentrations of plant remains of the entire floor; these remains were of the seeds and leaves of various kinds of plants and grasses, as well as of the seeds of chili and amaranth. Although some hunting and butchering activities are implied by the presence of the projectile points and the animal bones, it is obvious that the major emphasis of this activity area was on the utilization of plant foods.

The plant remains from Areas I, F, and C, the feces from Area H, and the bones from all other activity areas identified with this occupation, gave us a fairly reliable basis for estimating the sustenance of this wet-season macroband. The 6 deer, 3 cottontail, and fox would have yielded about 124.5 liters of meat, or 59 percent of their diet. A wide variety of wild plants would have made up 35 percent of their food, while the rest came from the domesticated or cultivated plants, such as chili, amaranth, and avocado (based on the 5 very large pits). The coprolite contained mainly seeds of *Setaria*, but also had pochote, cactus seeds, and meat. Perhaps the most significant aspect of their diet was the presence of domesticated or cultivated plants. The avocados certainly suggested the planting of this tree—from a time considerably earlier than the date of this occupation. Perhaps the inhabitants were returning to this area in a regular seasonal schedule to harvest what they had planted. Also, the chili and amaranth may have been planted early in the wet season, when the inhabitants were still subsisting on grass and mesquite seeds; later, the food gatherer would harvest the agricultural produce, that is, after these wild seeds had been consumed.

Both the occupations of this zone (Occupations 18,

19), while having rather different congeries of artifacts, were readily classifiable in the El Riego Phase. Two Carbon-14 dates from Activity Area I gave an average date of 4787 ± 134 B.C. (I-651, I-668) (*Radio-carbon* 11:90, 91). A date from overlying Zone XIII was 5050 ± 220 B.C. Thus, we have estimated that Zone XV was occupied between about 5300 B.C. and 4900 B.C.

The Way of Life of Zone XIV

Zone XIV and capping Floor 11 covered the entire area of the excavated site (see Fig. 98) sloping west to east with a change in elevation of approximately 2 meters from the highest point to the lowest. As was true in most of the other floors, the eastern half (from E5 to E15) was the lowest portion; there was a relatively sharp rise from E5 to E2, then, from E2 on over to W9 the floor leveled off. Two depressions which disturbed portions of the stratum were caused by features belonging to later floors, above. The depression located between W4 and W7 and S1 and N1 was caused by a rockfall that took place either at the time of Occupation 20 or shortly thereafter. The other depression between E5 and E7 from N1 to N3 was the bottom disturbance of a roasting pit dug at a much later time, deep enough to reach the depth of Zone XIV.

This stratum was largely dark brown throughout, and a series of black lines and charcoal lenses permeating the stratum suggested floors within the zone; one of these was fairly continuous from E7 to E13. Floor 11 capping Zone XIV was a thin, black organic deposit which extended over the entire zone.

The floors lying within the zone and the floor capping it presented some problems when we tried to determine an exact number of discrete occupations, although distribution of artifacts described a number of well-defined activity areas (see Fig. 115). Two burial pits, Feature Nos. 62 and 63, in the eastern end of the cave were dug down from only just below the vegetal capping floor of the zone, indicating a set of activities or an occupation only slightly earlier than that of the final, capping floor. Also, the animal bones recovered from beneath the floor in the west end, roughly in Activity Areas A, B, C, and D, were only of the dry season and seemed to represent a set of activities distinct from those of Areas E to J on Floor 11 itself, as well as from the activities carried on on the top floor of Areas A to D, which were mainly, but not exclusively, of the wet season. One interpretation could be that Occupation 20 began in the dry season of the year, utilizing the area of the lower portion of

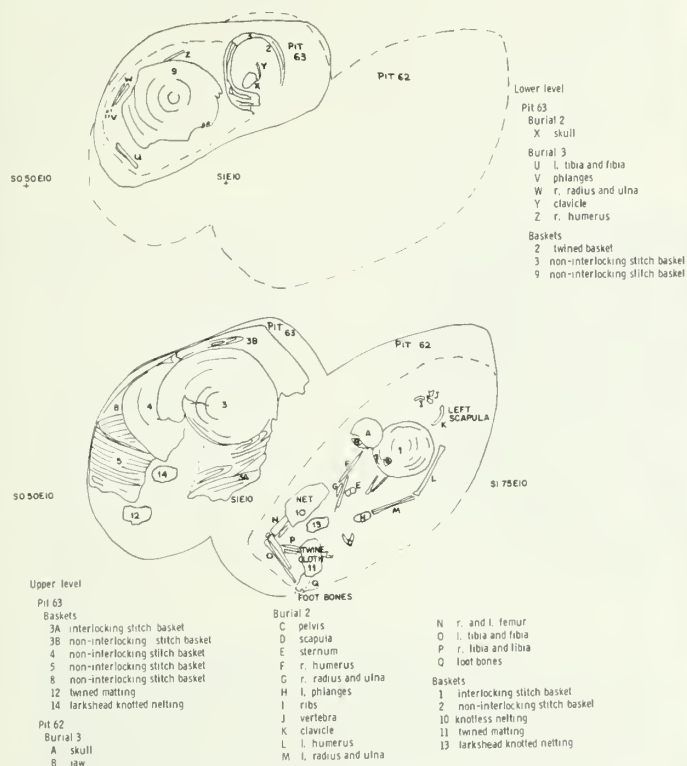


Fig. 113. Lower levels of Pits 62 and 63 showing baskets and burials in Pit 63 (upper half); upper levels of Pits 62 and 63 showing baskets in Pit 63 (lower left), and burials and baskets in Pit 62 (lower right).

the west half of the zone. It is probable that the burials were put in place in the east at about this time. Then, during a wet season of the year, the upper portions of the western part of the site were occupied, Occupation 21, as were the central and eastern portions of the site.

One set of activities represents an elaborate task that certainly had no connection with the activities throughout the rest of the zone. A series of burials, represented by two burial pits, Features No. 62 and No. 63, were made in a most unique manner. These predated Floor 11, but we do not know the exact temporal relationship to the early western occupation; in any case, the activities of the two regions were obviously radically different.

Five burials were found in Pits 62, 63, and 69 beneath Areas G and J (see Fig. 115). Two of these burials (Burials 2 and 3), probably contemporaneous, were found in overlapping Pits 62 and 63, centering at S1E10. Burial 2, found in Pit 62, had associated with it 1 basket and a portion of netting lying over the left femur, as well as some fragments of twine cloth found



Fig. 114. Burial 5, an adult female (to the left), and Burial 4, a burned male adult, overlying Burial 6 (to the right).

on the right tibia (see Fig. 113). This individual was approximately 5 years old at the time of death. The skull had been removed and exchanged with that of Burial 3. The skull from Burial 3 in the pit with Burial 2 was broken, charred, and scraped, as if the head had been roasted and cleaned as part of some ceremony. Burial 3 had associated with it in Pit 63, fragments of 8 different baskets. The infant represented by these bones had been under 6 months of age. The skeleton, minus the skull, had been placed on top of two of the baskets and then covered with the other baskets. These baskets and fabrics are described in detail in the volume on artifacts in the sections by MacNeish and Nelken (Vol. 2, p. 164) and Johnson (Vol. 2, p. 218).

Whereas these 2 pits, 62 and 63, are numbered separately, it is apparent that they were dug at almost the

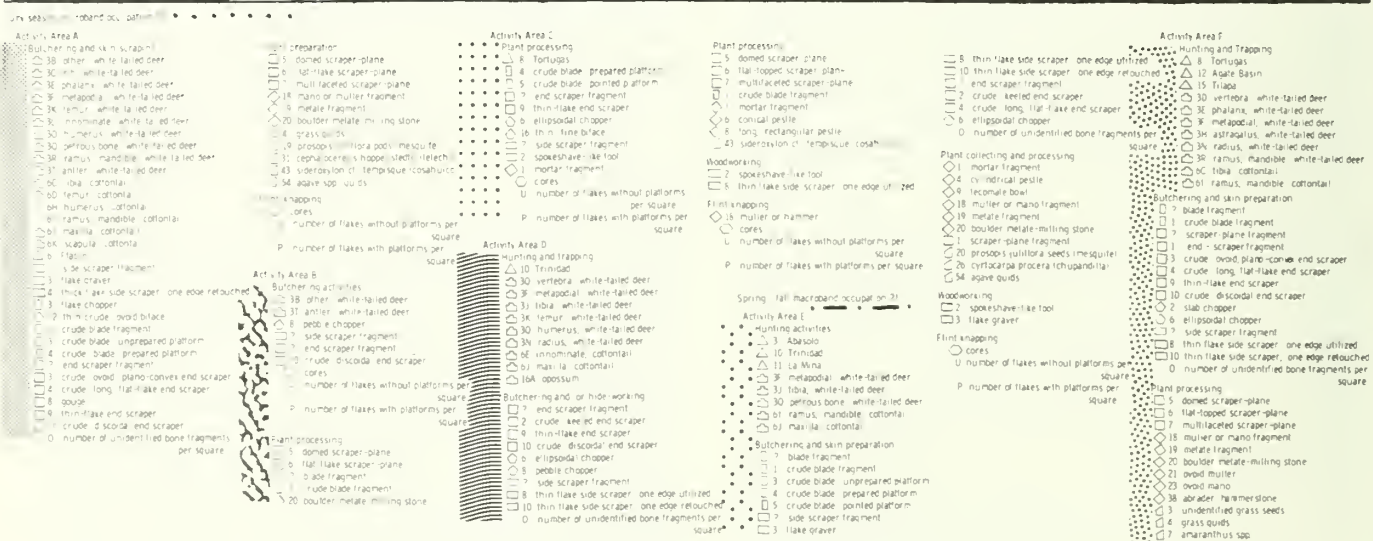
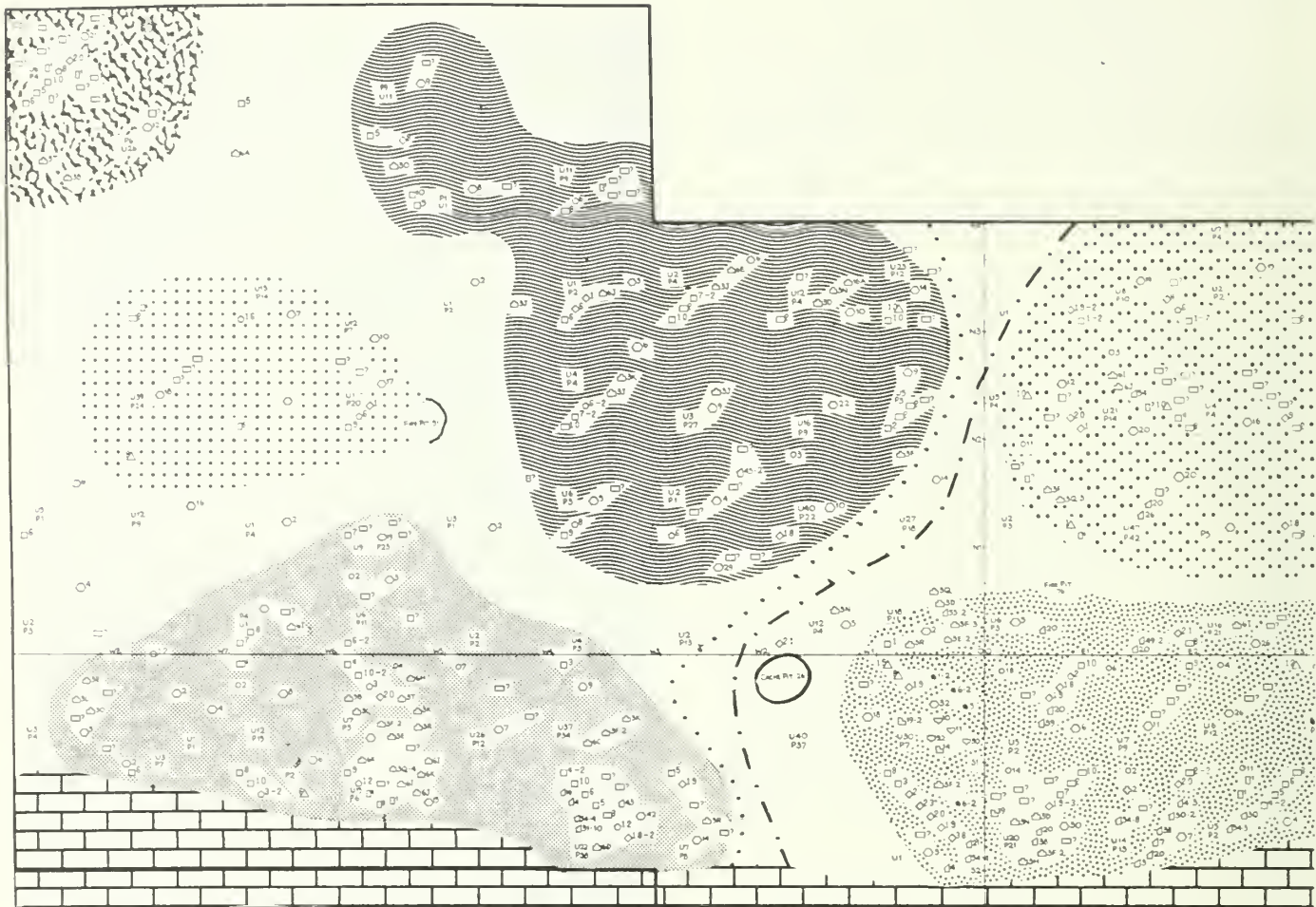


Fig. 115. Activity areas of Zone XIV of Tc 50 with a key to their artifacts, ecofacts, and features.

same time, and possibly they contained closely related individuals. It is probable that Burial 2 in Pit 62 was the first to be placed in the ground. Apparently some ceremony was involved, for the two children were decapitated and the head of Burial 3 placed with the body of Burial 2. This skull apparently was cooked, as part of some sort of ceremony, subsequently cleaned, or the contents of the brain cavity removed and eaten. The extension to Pit 62 was then probably excavated and Burial 3 placed on baskets in Pit 63 and then covered over with other baskets.

Burials 4, 5, and 6 were found in the long elliptical Pit 69 about a meter and a half long and a meter wide, reaching almost to the bottom of Zone XV (Fig. 114). The reconstruction of the events connected with this burial is as follows: first, a shallow section of the pit was smoothed off and covered with some sticks and a piece of mat. Then an extended child burial was placed in the pit. Over this burial, and evidently wrapping round it once, was a twin-wrapped blanket (see Johnson, Vol. 2, p. 218). On the skull were some pieces of woven mat or woven basket suggesting that a basket may have been placed over the head. The child of Burial 6 was very young—under 6 months—and, except for the baskets and blankets, no burial goods accompanied it. Whether this child burial was related to the burial of the other children in Features 62 and 63 is, of course, a matter of conjecture.

Shortly after this burial, perhaps a matter of hours, an extended female adult burial, No. 5, was placed in the east side of the pit. Again, some sort of bark or twig and grass mat had been laid down before the burial was laid in the pit. It was fully extended on its back with arms to the sides, although the left arm extended into the pubic area. In the general neck area there were a number of pieces of string, perhaps of a fabric, and right under the dislocated mandible was a small fragment of basket. The skull and part of the chest had been sparsely sprinkled with red ochre. In the southeast corner of the pit were found some coiled baskets.

After this burial, more grass was laid down covering the first burial (No. 6) and the left arm of the second (Burial 5). Burial 4 was then placed in the pit, possibly with some sort of wrapping in its pelvic area. Its head rested on one of the coiled baskets and 3 or 4 other baskets were placed in the area of the chest. A basket was also placed in the pelvic-stomach area right side up. The baskets were placed over the head upside down. Then, it appears, someone purposely lit or ignited the grass matting beneath Burial 4. This burned most of the arm and rib cage area as well as

the baskets covering it. The fire also charred the left arm and pelvic section of the female burial next to it. The pit was then covered with ash, but this fill did not actually extend up to the level of the top of Zone XIV. In other words, all three burials took place before the final occupation of the zone and the capping of the floor.

One cannot help wondering if this was a family group—father, mother, and child. For certain, their three deaths occurred at roughly the same time. Further, the adult female's jaw and part of her skull were badly disarticulated and there was evidence of burning inside part of the mandible. Could she have been beheaded before deposition in the burial pit? All in all, the complexity of the burial, the unlikely possibility of concurrent, natural deaths of these three people, and the obviously ceremonial immolation of the final burial suggest some sort of elaborate burial rites, perhaps even a purposeful killing of all, or at least part, of the group. This instance in Pit No. 69, taken together with the anomalous burials in Features 62 and 63, attests to the elaborateness of ceremonialism connected with death at this time in Mexico.

Evidence of another early occupation of Zone XIV was found in the lower levels of the west end of our trench. By plotting artifacts and ecofacts, three or four possible activity areas, A, B, C, and perhaps D, emerged. The lower levels of these contained dry-season plant and animal remains, while the upper portions had wet-season or multi-season remains corresponding to those ecofacts in the activity areas of the east end of the site. Unfortunately, we could not always tell whether artifacts belonged to the upper or to the lower occupation; yet we shall treat the western area as a discrete dry-season microband occupation of an earlier period (Occupation 20) (Fig. 115).

Activity Area A covered an area from W2 to W8 between S2 and N4. A heavy concentration of artifacts occurred in Square S2W3. Here were found numbers of end-scrapers, scraper-planes, a biface, and a graver. No projectile points were recovered from A, although a Flacco point occurred on the rock ledge behind the area. There was also a concentration of cottontail rabbit and deer remains, including a winter antler, although these lay more or less to the east of the general concentration of artifacts. There were blades and grinding stones. Plant remains included late fall *cosa-huico* pits and winter *tetecho* fruit. This was clearly a plant and animal food processing area, with cores and flakes indicating flint knapping also occurred.

Activity Area B was defined by a small concentration of deer remains (including winter antler), plus

scraper-planes, fragments of side-scrappers, end-scrappers, a grinding tool, and a biface, all found in Square W8N6. These are probably the partial representation of an area extending beyond the limits of excavation; and if excavation had proceeded farther to the west, perhaps we would have a better definition of this area. As it stands, B, like A, seems to have been mainly a food processing area.

Activity Area C ran from N2W7 to N2W5. Fire Pit 51 occurred at its edge. There were no animal remains. Some blades, bifaces, and side- and end-scrappers, a Tortugas point, and a mortar were the artifacts defining this area. Actually, Areas B and C may have been extensions of the same activity area, associated with Fire Pit 51, for they were both poor in animal bones. The difference between the two was that Area C contained different types of blades and bifaces, with no scraper-planes; whereas, Activity Area B is distinguished by its fair number of side- and end-scrappers and scraper-planes, and a metate. Connected or not, both Activity Areas B and C probably were involved heavily in the processing of plant remains.

Activity Area D covered a larger area, stretching from N6W5 down to N1W3 and over to N3. Through its central portion was spread a heavy concentration of animal remains; that is, between W1 and W6 in a 2½-meter-wide belt. Deer remains predominated; however, Audubon cottontail and opossum were also present. No projectile points were definitely associated with this activity area, although one Trinidad point was found at the very eastern margin of the defined area. Located in about the same squares as the animal bones were a number of side- and end-scrappers of various types. The most common was the crude, discoidal end-scraper pointing at hide working or butchering in this locus. The most abundant artifact in Area D was the scraper-plane; a total of seven were recovered, including 2 domed, 1 flat-topped, and 4 multifaceted. The most predominant biface found was the chopper. Area D also contained 2 pestles and a mortar, and 2 cosahuico pits, which together hinted at plant processing. In the eastern part of the same area were a number of spokeshaves and associated side-scrappers suggesting woodworking, and in the southern part were cores and flakes with a muller that probably was used as a hammer—evidence that flint knapping also was undertaken.

We see the W1 line as roughly the eastern border of the living zone encompassing Fire Pit 51 and several activity areas having to do with processing and eating meat (suggested by the animal bones found concentrated in the northeast section of this general living

zone). We emphasize meat processing, as opposed to hunting, since very few projectile points were found in the western part of the site. Also evidenced were activities related to plants, the processing of seeds, their storage, and so forth, illustrated particularly by the pestles and mortar. The scraper-planes probably had to do with the processing of fibrous plants and the end-scrappers, with hide working. The foodstuffs were relatively meager (assignable to the lower layers of the zone) comprising 3 deer, 3 rabbits, and an opossum; also found were 2 cosahuico pits, 4 *Agave* quids, a grass quid, a mesquite pod, and 10 tetecho fruit. This would seem to indicate that their diet was overwhelmingly of meat, supplemented by small amounts of vegetal foods obtained from collecting. This diet, along with the inferred activities, reflected by the ecofacts and by the artifacts, contrasts markedly with the sustenance and subsistence activities of the later occupation represented by both the activity areas to the east and those above—that is, in the top levels of the western activity areas.

For the purpose of making clear the contrast in diet between the two occupations, we precede the description of the several later activity areas with a breakdown of the diet, extrapolated from their collective remains. Estimates for Activity Areas E through J and for the top levels of A, B, C, and D of quantities of foods available to this later group occupying Zone XIV, show about 7 percent of their diet came from domesticated avocado, chili, mixta squash, and amaranth; 38 percent, from a wide variety of wild plants; and 55 percent, from 8 deer, 5 rabbits, 2 lizards, and a turtle. These proportions are indicative of the differences between the subsistence patterns of the two occupations, there being, on the part of the second, evidence of less hunting and more plant collecting, and at least some planting and harvesting of domesticates. These plants and animals also showed that this occupation lasted several seasons, for Activity Areas J and G had turtles and lizards of the summer wet season and mesquite beans and *Setaria* seeds of the spring, while Area G had avocado of the fall. Further, Area F had plants and animals from the spring to the fall, and Area E had spring mesquite seeds, as well as a chupandilla pit from the fall. Thus, the "eastern" occupation was of longer duration, and the size of the area it covered suggests it was by a group larger in size than that of the earlier western occupation.

A brief review of the activity areas belonging to this later occupation reveals that, along with the diet, the activities were correspondingly different from those of the earlier group.

Activity Area E, extending from the 0 north-south line to E5 and from N1 to N4, was distinguishable from Area D by its complete lack of scraper-planes and a proportionately larger number of side- and end-scrapers. Also, Area E contained 6 projectile points—4 Trinidad, an Abasolo, and a La Mina—while Area D had none. In addition, E contained blades and a stone bowl which were lacking in Area D, and finally, there was a relative lack, or else complete absence, of animal bones in much of Area E. However, like Area D, it had many grinding tools. Area E lay generally just north of Fire Pit 76; this feature may have been related in use to the activities in both Areas E and F. The scraper-planes, mortars, pestles, and milling stones, in association with plant remains, suggest that a major activity was collecting and processing plants. The deer bones, points, blades, chopper, and side- and end-scrapers testified to hunting, butchering, and skin working. Other activities would have been woodworking and flint knapping.

Area F extended from W1 to E5 and from just north of the 0 north-south line to S2. It was roughly the area between and including Feature 76, the fire pit, and Feature 27, the cache pit. There was a general lack of animal bones; but many plant remains occurred, mainly spring seeds, and summer amaranth and mixta squash. Side-scrapers predominated over end-scrapers; scraper-planes were numerous; and string, nets, and a basket occurred. Manos and metates were found throughout the area, and Tilapa, Agate Basin, and Tortugas projectile points, in association with deer and rabbit bones, indicated hunting and trapping. The end-scrapers, choppers, and side-scrapers, as well as the many smoothed bones, suggested meat preparation and probably skin working. Flint knapping almost certainly was undertaken in the process of manufacturing the tools of these trades. The major concern, however, again seems to have been plant processing, for a wide variety of plants were found in association with various kinds of grinding stones and scraper-planes. There is some evidence that several of these plants were collected for reasons other than for food; for instance, we found two cut and polished, as well as worked, sticks associated with gravers, gouges, and spokeshaves, the signs of woodworking. Other plants collected were utilized for making string (various kinds of knots were found), nets, and baskets. The occupants seem to have reached a considerable degree of versatility in the basket-weaving craft, for, not only did we find coiled baskets of non-interlocking stitch, but also, the products of their own sophistication—interlocking-stitch baskets. The basic and perhaps old-

est types occurred, with twining employed for both baskets and nets, along with simple coiling of knotless nets. We note that the incidence of abundant food remains, including perhaps cultivated amaranth, appears not only to have related to—indeed, to have led to—a longer stay in the rock shelter, but also to have been accompanied by more complex and diversified activities.

It may be that Activity Areas E and F should be considered as one general activity area with specialized activities occurring in its different parts. In this view, a broad area having Feature 76 as its center would resemble the situation represented by the earlier Activity Areas, A, C, and D, which more or less centered about Fire Pit 51.

East of the E5 line we identified a different group of activity areas, which appeared much more specialized. Activity Area G, defined as the area between E6 and E10 and from S2 to just north of the 0 east-west line, contained a concentration of end-scrapers, 3 projectile points (a Tilapa and 2 Trinidad), and an abundance of animal remains, largely deer, with some cottontail rabbit and mud turtle as well. There were also remains of cultivated avocado, and some bifaces and many chips were found. This was obviously an area related to hunting and its attendant activities, such as butchering and tool chipping. There was again evidence of woodworking: gouges and spokeshaves and scraper-planes. Many grinding stones show plants were processed here. A domesticated avocado pit occurred pointing to yet another activity—hydrohorticulture.

A cluster of end-scrapers and points found in Squares N1E8 and N2E7 to E9 was the basis for defining Activity Area H. Some manos and metates also occurred in this general area as well as the woodworking tools, gouges and spokeshaves. No animal bones were associated with these artifacts, but there were a Tilapa and an Almagre point. It is possible that this concentration did not constitute a true activity area; yet we have defined it as one on the basis of this very specialized representation of tools.

In Squares N3E8 and N3E9 occurred a concentration of projectile points—1 Hidalgo, 2 Trinidad, and 1 Tilapa, bifacial choppers, end-scrapers, and scraper-planes, associated with a few remains of deer. This has been called Activity Area I, probably a specialized activity area concerned with the processing of animal remains gained in the hunt.

Finally, Activity Area J, extending from Square E12S2 to Square E15 over the area of the earlier burials (Feature 69) included a dense concentration of

projectile points (almost half of the points from the whole floor were found in this area)—10 Trinidad, 1 Garyito, 3 Tilapa, 1 Coxcatlan, and 1 Hidalgo. Besides the projectile points, a large number of end- and side-scrapers, a quantity of deer remains, and many spring and summer seeds, including amaranth and chili, were found here. This activity area also evidently was concerned with hunting and food processing activities.

The macroband group of this eastern multi-season occupation seems not only to have been involved in hunting, skin scraping, butchering, and the gathering and processing of plant foods, as was the earlier dry season family group to the west, but, in addition, seems to have planted and harvested domesticated plants and done much more plant collecting. Further, from Area F there came good evidence they were making string, tying knots, and weaving baskets and nets. Areas E, G, H, and J contained many end-scrapers, the tools of skin scraping, and bone awls and needles, suggesting tailoring. The whole area was full of chips, several antler hammers, choppers, and scraper-planes that could have served as cores, all evidences of flint knapping. The whittled sticks and bark in association with numerous flake gravers, spokeshaves, and gouge-like tools speak for a woodworking industry, and there were many bone tools suggesting yet another craft. Again, the summer season with more abundant foods seems to be correlated with a much more varied way of life.

Occupations 20 and 21, represented by contrasting patterns of seasonal life and different artifact complexes, indicate that the whole zone must be a late component of the El Riego Phase. No Carbon-14 dates were obtained, but the dates from the underlying Zone XV and overlying Zone XIII suggest that Zone XIV falls in the period from 5200 to 4800 B.C.

The Way of Life of Zone XIII

Zone XIII was the level of the first occupation of the Coxcatlan Phase; it covered the western half of the site from E4 to the western limits of the excavation. This stratum probably extended far west of the edge of excavation, and some artifacts were found in the area between E4 and E7 and the 0 east-west line and N2. The zone was composed of gray ash, and capped by a thin charcoal floor (Floor 12). It had three recognizable hearths within it. Refuse seems to have extended far west of excavation and was sufficiently large to suggest a macroband occupation (Occupation 22); that is, a number of families living side by side engaged in similar activities.

Sandhill crane and other bone fragments, tetecho

fruit, and pochote in Area A suggested a dry-season encampment, and the chupandilla in Areas A, C, and D indicated that the inhabitants were still living on the floor during the fall. Furthermore, remains of corn, chili, mixta squash, and gourd, in most of the areas, which reach fruition in the summer, hinted that the occupation began in that season, whether or not the inhabitants ate these foods during the summer or stored them for the winter season. There was also a quantity of spring seeds, but, as these are readily storable, they may have been brought to the cave from a previous occupation. We estimate, therefore, that Occupation 22 of Floor 12 began in late summer, and, with food surpluses, lasted through most of the winter; then again, it could have been a year-round occupation by a single macroband.

All the activity areas seem to have been roughly contemporaneous; and, while keeping in mind that diet would vary considerably with season, we gained from our study of the remains a good overall picture of the food on which they subsisted during their stay. A coprolite sample, for instance, contained, besides maize, pochote, *Setaria*, and meat. For the entire floor then, extrapolating from the remains: the meat from 2 deer, plus rabbit, and crane equaled 41.5 liters of food, or 30 percent of their diet; food from wild plants represented 52 percent; and domesticated corn, gourd, mixta squash, and chili made up about 18 percent. These proportions of foodstuffs have obvious implications bearing on the subsistence activities undertaken by the group. Unlike the previous horizons, planting domesticates or cultivars was by this time a major wet-season activity. While plant collecting often gave greater yields than hunting or trapping, it was the cultivation of plants that required less energy, but gave more energy in terms of nutrition.

We shall briefly review the other activities indicated by the concentrations or clusters of artifacts occurring on the floor (Fig. 116). The most important of these has been designated Activity Area A and generally covered the area from W2 to E3 between S2 and N1. In Square E1 was feature No. 60, a hearth-like area about 30 cm. in diameter. The artifacts and ecofacts indicated a number of activities, and among the most important seem to have been collecting, growing, and processing plants. The wide variety of plants found in association with numerous manos, mullers, milling stones, scraper-planes, and metates of several types, attests to this fact. Again, some of the plants collected were utilized for purposes other than for food. We found some wood fragments in association with side-scrapers, a graver, spokeshave, and gouge, and chop-

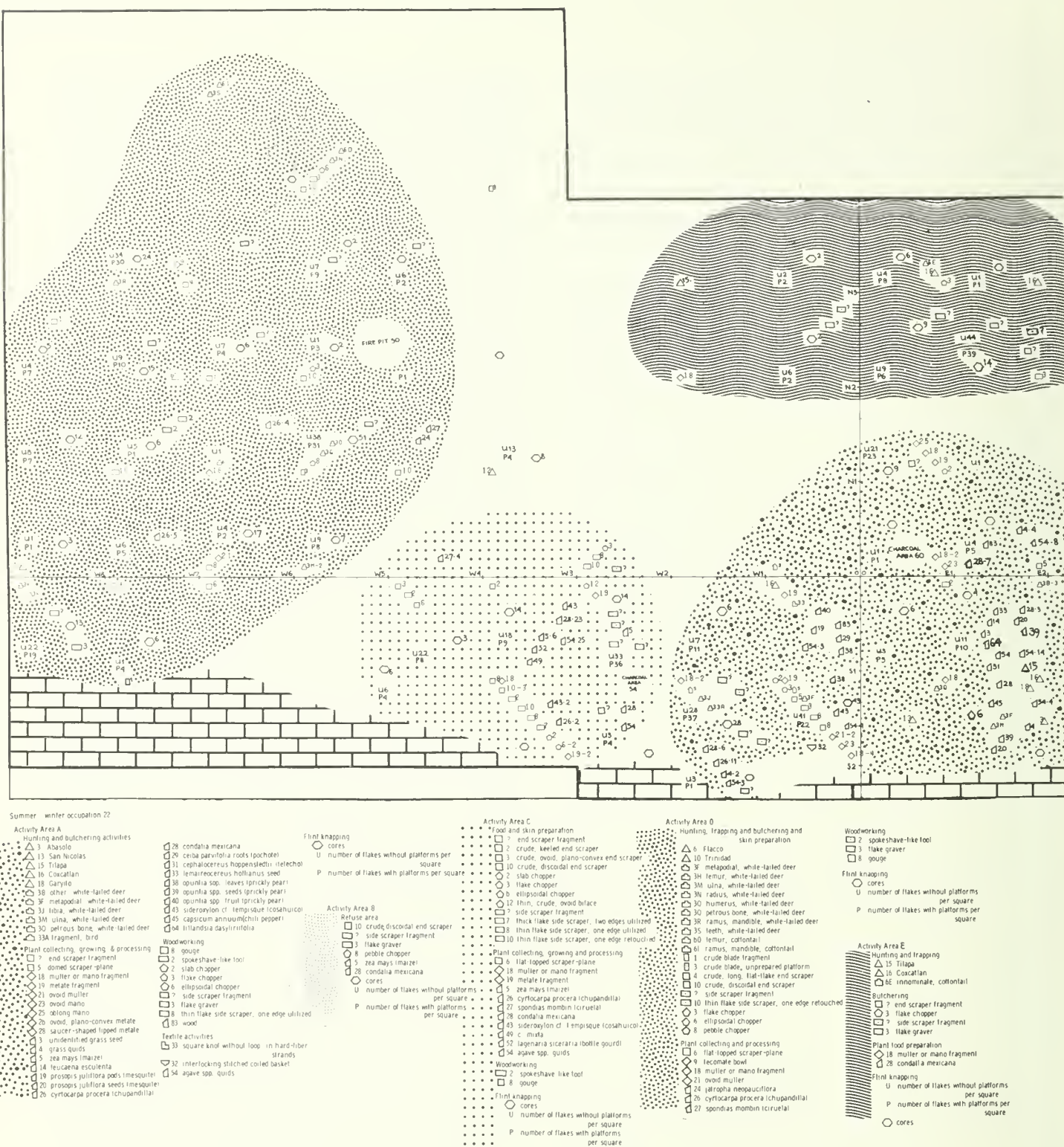
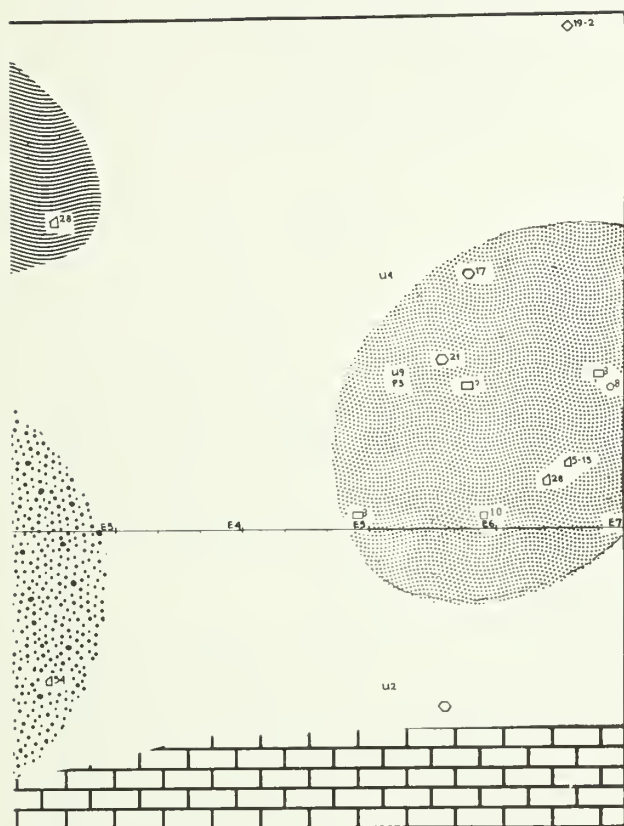
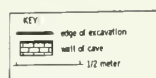


Fig. 116. Activity areas of Zone XIII of Tc 50, with a key to their artifacts and ecofacts.



pers, suggesting woodworking. A basket and a knot along with some *Agave* remains indicated *Agave* fibers were used for making interlocking stitches to bind together the coils made of bundles of grass. The hard artifacts of the plant processing complex, that is, the 18 grinding tools, have other important implications. Eleven of them (5 of which were unfinished) were found in the southwest corner of the area in association with cores and flakes, many of which were of volcanic tufa from the El Seca Basin of Central Puebla, as were most of the grinding tools. It is apparent not only that some of the grinding tools were made in this locality by means of sawing (with side-scrapers), gouging (with gouges), and grinding, but also, more important to us, raw material had been imported for the task. This was a new development, for, in earlier horizons, the only imports were occasional obsidian chips, cores, artifacts, a few volcanic tufa grinding stones, and marginella shells. Here instead was a mass of imported material, and we believe it to be evidence of a new

type of exchange system. It implies that someone went on a specific errand to the source to procure the needed materials. Thus, a system of direct procurement of foreign goods is indicated, but, to clarify the meaning of this system, it is our belief that neither the miners of the rock, the producers, the agents, nor the person who delivered the materials were full-time specialists (that is, acting in this special capacity full time, as one might under a system of division of labor); nor do we believe that the manufacturers or distributors of the grinding stones were anything but part-time specialists, nor that the goods were distributed in any very formal manner. This system or subsystem of exchange we have termed the "direct procurement system" to distinguish clearly from the earlier system of "indirect procurement", whereby goods were passed from their source, hand-to-hand, before reaching their final user. While this system is reflected by the artifacts of Zone XIII (and again in Zone XI, to be discussed below) in its mere technological aspect, it is our opinion that the

great increase in the use of plants domesticated elsewhere during the Coxcatlan period (such as avocados, gourds, moschata squash, black and white sapote, and beans) was equally the result of the use of this new exchange system.

Other activities also probably occurred in Area A, such as butchering and preparing meat obtained by hunting, for we found deer remains along with San Nicolas, Coxcatlan, Garyito, and Tilapa points, and choppers and side-scrapers. Furthermore, the charred bones suggest much of the meat was roasted. Numerous cores and flakes testify to the chipped-tool industry that has been mentioned already, above; the Abasolo point probably was a preform and a product of this industry.

Activity Area B emerged as an eastern projection of the living area, A. It covered over 3 square meters, generally, from E5 to E7 between 0 and N2. No animal bones or points were found here; only an end-scaper, 3 side-scrapers, and a pebble chopper, with many chips and cores and meager plant remains. This very limited area, removed from the focus of the main part of the living floor, could well have been a dumping ground for refuse.

On the other side of A, Activity Area C included a heavy concentration of side- and end-scrapers in association with bifaces—largely slab and ellipsoidal choppers—metate fragments, a mano fragment, and many chips and cores, recovered mainly from its eastern half where there was also a small charcoal area, feature No. 54. The area spread over 5 square meters between W2 and W5 from north of the 0 axis to S2. No deer bones nor projectile points occurred, although an Agate Basin point lay just north of C. The major concern of this area, as in Area A, plant collecting, and harvesting, and plant food preparation, was reflected in the finds here, which included corn, chupandilla, ciruela, cosa-huico, squash, and gourds, in association with grinding stones. In addition, woodworking is indicated by the gouge and spokeshave, and the *Agave* remains may mean string-making and weaving. The other artifacts, which include many side-scrapers, some choppers, and a few end-scrapers, in this context are difficult to interpret, but they might have been employed in plant processing, rather than in butchering and skin preparation. The number of cores and chips suggests some of these tools were made right here.

Activity Area D, extending between S1 and N5, and from W4 to the western edge of our excavation, probably continued into the unexcavated, western portion of the site. It contained a fire pit, Feature No. 50, about 40 cm. in diameter, toward its eastern edge, centered

at N2.5W5. While planting, plant collecting, and processing are all attested to by the chupandilla, in particular, and by the mano fragment, muller, and tecomate stone bowl, the more important concern in this part was hunting, trapping, butchering, and, perhaps, skin preparation. The evidence for this was the Flacco and Trinidad points, with deer and rabbit bones, as well as blades, choppers, end- and side-scrapers. The gouges, spokeshaves, and gravers suggest woodworking, and many cores and flakes again evidence flint knapping.

Activity Area E was situated toward the front of the cave, north of Area A. Whether it represents a dumping ground for things thrown in the direction of the edge of the shelter, from Area A, for instance, or else, another living area that might have extended still farther north, is difficult to say; we suspect it was the former. Tilapa and Coxcatlan points and a rabbit bone suggest both hunting and trapping, while the chopper and side-scrapers might have been connected with butchering. A single plant remain plus the mano fragment may be the traces of plant food preparation. And the numerous chips and cores may be taken, as usual, as evidence of flint knapping.

Zone XIII, then, appeared as a single living floor supporting a variety of activities. The most intense area of activity was in the southeast corner of the living floor, which has been described as Activity Area A, where hunting and food processing activities as well as woodworking, string making, weaving, and flint knapping were all in evidence. The heavy concentration of preserved plant remains, along with associated manos, metates, and scraper-planes, were, in this case, particularly interesting, for the evidence inherent in these artifacts, that is, their foreign material, testified indirectly to the practice of a new system of exchange. Activity Area C, characterized by the absence of animal bones and by a large concentration of both side- and end-scrapers and choppers, was possibly an area where artifacts were stored; on the other hand, the area may have been reserved for hide preparation. The general living area of the floor was likely Area D around the fire pit, where butchering, or at least the processing of meat and of plant foods, flint knapping, and hide preparation were carried out.

The total artifact complex from this zone is markedly different from the ones from underlying floors. This earliest Coxcatlan Phase component represents perhaps a whole new way of life brought on by the use of domesticated or cultivated plants. From Activity Area C, we have a Carbon-14 date of 5050 B.C. \pm 220 (I-457) (*Radiocarbon* 11:89).

The Way of Life of Zone XII

Zone XII was the second of the occupation floors attributed to the Coxcatlan Phase. It was confined for the most part to the western half of the site, extending from E3 to W9 and from S2 to N5. Some traces of this floor, however, were found in the general area between E7 and E13 from S3 to S1. Zone XII was a whitish-gray ash layer underlying the very thin brown line of Floor 13.

Although the artifacts were distributed over a relatively large floor area, they were scattered and sparse. There were no fire pits. On the basis of this, we guess that the occupation was that of a microband. Artifacts and ecofacts were clustered in 4 areas, designated A through D, which all contained corresponding seasonal indicators, suggesting again a single occupation by a small group (Fig. 117). Area A contained spring seeds, summer squash, summer amaranth, and fall fruits; Area B, a lizard of the wet season. Area C had spring seeds, summer corn, and fall antler and fruits, while Area D had summer amaranth, and pits of chupandilla which reaches fruition in the fall. The occupation probably began in the spring and lasted through the fall.

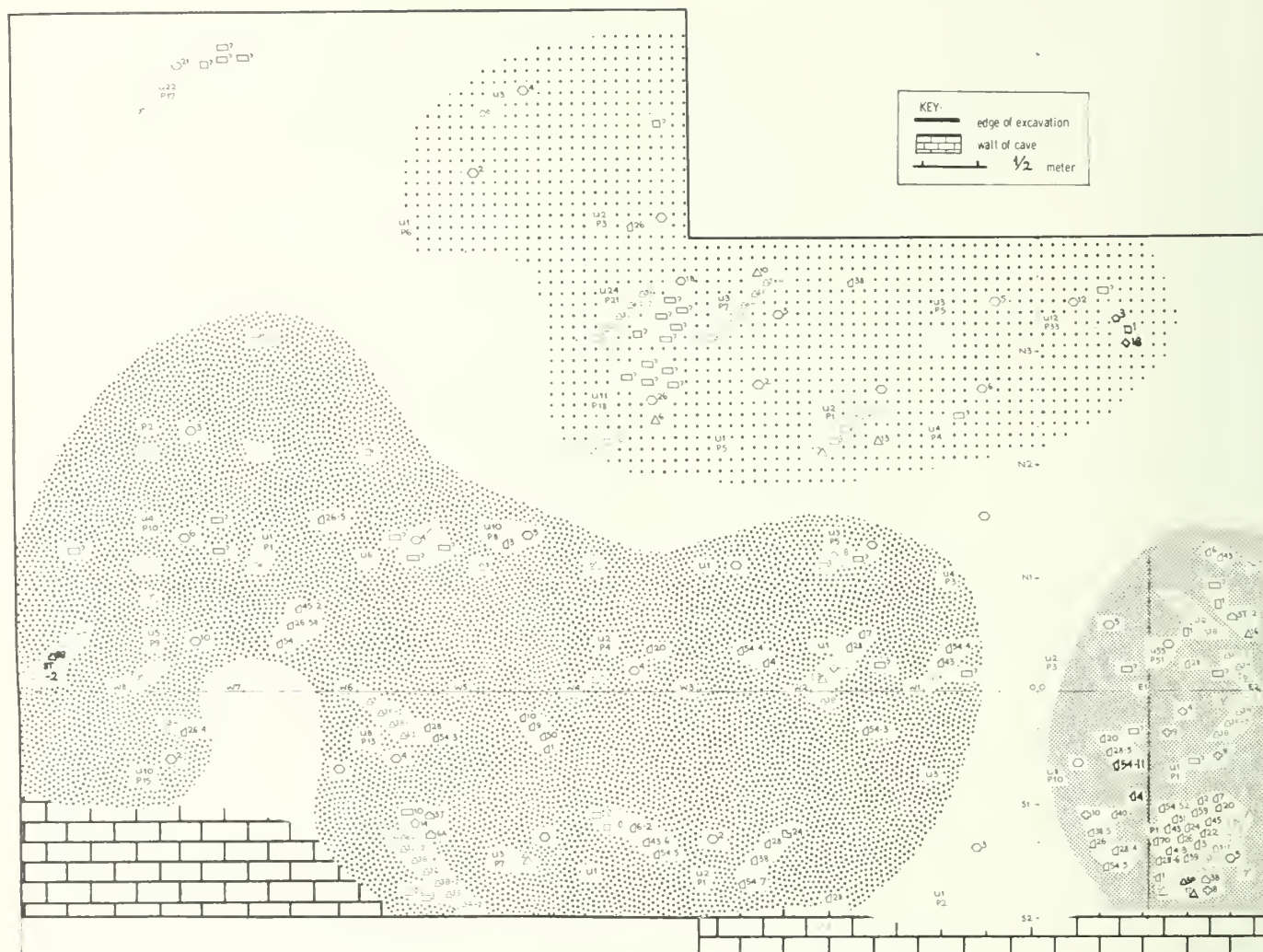
The animal bones and plant remains from the whole floor allowed us to estimate a diet much like the one of the previous Coxcatlan occupation, and subject to the same error in terms of seasonality. Again, the dominant part of their diet, 60 percent, came from a wide variety of wild plants, 33 percent from meat, and 7 percent from horticulture produce, avocado, chili, corn, amaranth, and moschata squash. The proportion of their diet supplied by domesticates or cultivars did not increase over that of Floor 12, but the variety of domesticates did.

A study of the materials from the four activity areas tells us something about the specific tasks in which they were engaged. Area A spread over the southwest third of the occupation floor covering the area of that corner of the excavation (from roughly S2W1 to N3W7). Area A contained a large number of animal bones, including deer and Audubon cottontail remains, along with Flacco, Shumla, Tilapa, and San Nicolas projectile points. Thus, hunting and trapping clearly are indicated. The main concentration of animal remains were associated with side- and end-scrapers and choppers; so perhaps the butchering and hide working took place here. On the other hand, the choppers and scraper-plane could have been cores. These were associated with many chips and a possible muller that could have been a hammerstone. Certainly this was a flint-knapping locus. Area A also contained manos and

boulder metates, and many seeds and plant remains occurred in the east end, along with a hemispherical mortar, suggesting plant collecting and processing. *Agave* quids and a knot hint at string-making, possibly weaving. Because of the diffuseness of finds in this area, it is difficult to subdivide it in terms of localized tasks. It appears that Activity Area A represents the center of activity in general on this floor, perhaps the "living room/dining room" area of the habitation that took place during the accumulation of Zone XII.

Activity Area B covered the area between E1 and W5 from N2 to N5. This was a more densely concentrated area than Area A and contained various kinds of artifacts as well as a distinct concentration of bones of small animals, such as lizard, fox, and cottontail, besides a single deer bone. Within this area were two concentrations of projectile points: one in N2W3, and the other in N2W1. The first-mentioned group included an Agate Basin and a Flacco point; the other, a San Nicolas and a Trinidad point. There was also another Trinidad point to the north of these. The two groups contrast in terms of shape, the points of one group being stemmed, and those of the other, leaf-shaped. Perhaps the difference in the fashioning of the points represents a difference in stylistic preferences—that is, these may have belonged to two different people who had different personal tastes—or else in specific function. This area also contained a concentration of side-scrapers and fragments, the majority of which were flake graters; but there was a spokeshave associated with bones of fur-bearing animals. Also, the crude, discoidal end-scrapers occurred at this same point, suggesting that skin preparation and tailoring took place here. Activity Area B also contained a fair number of manos and metates. Thus, seed preparation was indicated as another major activity, along with hunting, butchering, woodworking, flint knapping, and trapping.

The best-defined activity area of Zone XII was the 3-to-4-square-meter area between S2 and N2 and 0 and E2, Area C. This area had many of the deer bones and also the largest concentration of projectile points from the zone—largely Coxcatlan points, but Abasolo and Almagre points along with atlatl parts were found as well. Also associated were end- and side-scrapers and a snare. The deer bones just north of the concentration of artifacts were particularly interesting because they included several intact larger parts of deer. Flannery (Vol. 1 of this series, p. 162), in analyzing these bones, had the following to say: "Once again deer seem to have been brought whole to the rock shelter for butchering, but during this phase there is no evidence of the



Spring - fall microband occupation Z3

Activity Area A

Hunting, trapping, butchering and skin preparation

- △ 6 Flacco
- △ 13 San Nicolas
- △ 15 Tilapa
- △ 19 Shumia
- △ 38 other, white-tailed deer
- △ 36 metapodial, white-tailed deer
- △ 34 astragalus, white-tailed deer
- △ 31 tibia, white-tailed deer
- △ 30 pelrous bone, white-tailed deer
- △ 3R ramus, mandible, white-tailed deer
- △ 3S teeth, white-tailed deer
- △ 3T antler, white-tailed deer
- △ 6A other, cottontail
- △ 6I ramus, mandible, cottontail
- △ 6J maxilla, cottontail
- △ 9A fragment, fox
- △ 4 crude blade, prepared platform
- △ 7 side scraper fragment
- △ 3 flake graver
- △ 10 thin flake side scraper, one edge retouched

- 3 flake chopper
- 12 thin, crude, ovoid biface
- 14 large disk
- 5 domed scraper-plane
- 10 crude, discoidal end scraper

Plant collecting and processing

- 7 hemispherical mortar
- 18 muller or mano fragment
- 19 metate fragment
- 20 boulder metate-milling stone
- 21 ovoid muller
- 1 dijon edule
- 3 unidentified grass seed
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana
- 9 amaranthus spp.
- 9 acacia spp. pods
- 10 acacia spp. seeds
- 20 prosopis juliflora seeds (mesquite)
- 26 cyrtocarpa procera (chupandilla)

- △ 28 condalia mexicana
- △ 38 opuntia spp. leaves (prickly pear)
- △ 43 sideroxylon cf. tempisque (cottonwood)
- △ 45 capsicum annuum (chili pepper)
- △ 50 c. moschata

String-making and net weaving
 △ 24 square knot with loop, in hard-fiber strands
 △ 54 agave spp. quids

Flint knapping

- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Activity Area B

- △ 6 Flacco
- △ 10 Trinidad
- △ 12 Agate Basin
- △ 13 San Nicolas
- △ 3J tibia, white-tailed deer
- △ 6F ulna, cottontail

- △ 6H humerus, cottontail
- △ 6I ramus, mandible, cottontail
- △ 9A fragment, fox
- △ 24A fragment, lizard

Butchering, skin preparation and tanning

- 7 end scraper fragment
- 1 scraper-plane fragment
- 10 crude, discoidal end scraper
- 7 side scraper fragment
- 2 spokeshave-like tool
- 3 flake graver
- 3 flake chopper
- 6 ellipsoidal chopper

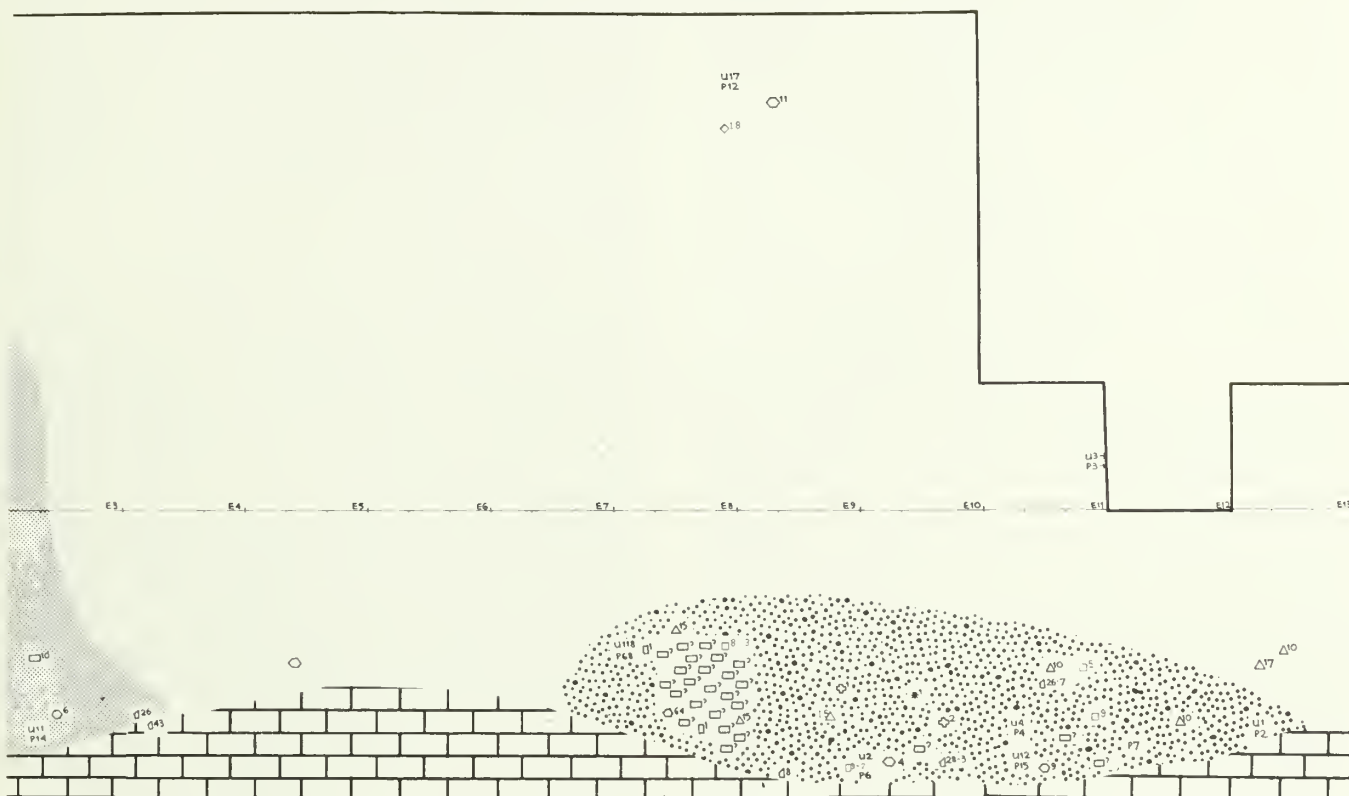
Plant preparation

- 18 muller or mano fragment
- 19 metate fragment
- 26 cyrtocarpa procera (chupandilla)
- 38 opuntia spp. leaves (prickly pear)

Flint knapping

- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Fig. 117. Activity areas of Zone XII of Tc 50, with a key to their artifacts and ecofacts.



Activity Area C

Hunting and butchering activities

- △ 3 Abasco
- △ 16 Coxcatlan
- △ 17 Almagre
- △ 3B other, white-tailed deer
- △ 3C rib, white-tailed deer
- △ 3D vertebra, white-tailed deer
- △ 3F metapodial, white-tailed deer
- △ 3J tibia, white-tailed deer
- △ 3K femur, white-tailed deer
- △ 3M uina, white-tailed deer
- △ 3N radius, white-tailed deer
- △ 3P scapula, white-tailed deer
- △ 3Q petrous bone, white-tailed deer
- △ 3T antler, white-tailed deer
- △ 9 atlatl
- △ 10 snare part
- 10 crude, discoidal end scraper

cores

U number of flakes without platforms per square

P number of flakes with platforms per square

Woodworking

- ⊕ 4 small pointed stick
- ⊕ 8 cut or pierced gourd
- 1 crude blade fragment
- 7 side scraper fragment
- 10 thin flake side scraper, one edge retouched

Seed storage

- △ 1 dijon edule
- △ 3 unidentified grass seed
- △ 4 grass quids
- △ 5 zea mays (maize)

- △ 6 acrocomia mexicana
- △ 20 prosopis juliflora seeds (mesquite)
- △ 22 casimiroa edulis (white bean)
- △ 24 jatropha neopauciflora
- △ 26 cyrtocarpa procera (chupandilla)
- △ 28 condalia mexicana
- △ 31 cephalocereus hoppenstedtii (tetecho)
- △ 38 opuntia spp. leaves (prickly pear)
- △ 39 opuntia spp. seeds (prickly pear)
- △ 40 opuntia spp. fruit (prickly pear)
- △ 43 sideroxylon cf. tempisque (cosahuico)
- △ 45 capsicum annuum (chili pepper)
- △ 54 agave spp. quids
- △ 59 yucca periculosa seeds
- △ 70 grasses (unidentified)

Activity Area D

Flint knapping

- △ cores
- △ 10 Trinidad
- △ 15 Tilapa
- △ 17 Almagre
- △ 1 crude blade fragment
- △ 3 crude blade, unprepared platform
- △ 7 side scraper fragment
- △ 5 domed scraper-plane
- △ 9 thin-flake end scraper
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Woodworking

- ⊕ 1 polished stick
- ⊕ 2 cut stick
- ⊕ 8 gouge

Plant collecting

- △ 8 persea americana (avocado)
- △ 26 cyrtocarpa procera (chupandilla)
- △ 28 condalia mexicana
- * 1 4-ply coarse rope, Z-twist (agave)

meticulous smashing of long bones seen in El Riego times. Some bones, in fact, seem to have been discarded while still articulated with their neighbors and held together with ligaments, especially bones of the lower leg, like the metatarsal, astragalus, and others." These data suggest that Activity Area C was an area to which whole animals were brought back from the hunt to be butchered in camp, using the blades and end- and side-scrapers. Cut gourds, pointed sticks, as well as the snare and atlatl, suggest woodworking, in which activity the blade and side-scrapers were otherwise possibly employed. Mesquite, *Setaria*, amaranth, maize, *Opuntia*, and chili seeds, and many other plants were found, but there were no grinding stones, and this suggests the plants were stored in this part.

Activity Area D was in the eastern half of the site where only traces of this occupation floor were found. It extended from E7 to E12, and, from the cave wall at S2, to S1. It was comprised largely of projectile points and side- and end-scrapers. The projectile points recovered included 3 Tilapa types, 1 Almagre, and 3 Trinidad, all stemmed points. This area could be divided into two subareas: west of E9 were found the 3 Tilapa points, end-scrapers, and blade fragments; spread diffusely over the rest of the area, east of E9, were: 1 Almagre point and 3 Trinidad points in association with a thin, utilized end-scraper. Also in this part were found a scraper-plane, and many flakes and cores. It is our guess that, in this corner of the floor, some of the inhabitants practiced the chipping out of flint projectile points. Wood shafts and gouges suggest the shafts for their points were probably made in this area, also.

If one considers that the four activity areas belonged to a single occupation that lasted over several seasons, then one receives the impression that a wide range of tasks were carried out by members of the group in each of the different, seemingly restricted, areas; as: flint knapping, deer hide preparation, and food preparation in B; seed storage and butchering in C; and, in D, the making of projectile points.

The artifacts from this floor were of Coxcatlan types, and the position of the zone between two Carbon-14 dated floors (Zones XI and XIII) was the basis for our estimating that Occupation 23 took place between 4700 and 4300 B.C.

The Way of Life of Zone XI

One of the most extensive floors in the Coxcatlan rock shelter was the 14th occupation floor of Zone XI, which extended over the entire excavated area. The floor sharply delineated everywhere south of the N3

east-west line; and while it was definitely present north of that line, due to the sun-bleaching of the soil, many occupation floors were obscured to the point of that line and could not be clearly distinguished in the parts north of it (Fig. 98). The highest portion of this floor was in the southwest corner, where it ranged from 2 to 2.7 meters below the arbitrary datum plane. To the north, it dropped off steeply from 2.7 meters to 3.6 meters at the N3 line. At the E2 line it dropped rather sharply from 2.6 meters down to 3.3 meters. Between E2 and E10 it was relatively level, gradually dropping from 3.3 to 4.1 meters at E10; from there, it dropped off sharply. The area around Square N2E6 was disturbed by the excavation of Feature No. 1 from an overlying, later zone.

Zone XI was composed of soil varying from gray to brown, and from gray to red in color. Its texture and color suggested that throughout the area there had been fire-building activity; either the organic material making up the deposition had been burned, or else fire pits and fires, at one time or another, had been built over the entire area.

All of the large activity areas contained enough representative grass seeds, *Setaria* seeds, mesquite seeds, and pochote pods, to suggest that the whole floor was occupied by a macroband in the spring; corn, avocado, and squash were found throughout the area as well, so the occupation probably continued into the summer. Furthermore, fall fruits occurred in Areas E, C, and A, and hardened deer antler in C, indicating that some, if not all, of the occupants lived on in the cave into the fall or even early winter.

Considering the possibility that this floor could have been visited only intermittently during the year, it is difficult to assess the actual amount of food these people used, in terms of proportional amounts coming from their various sources—i.e., the hunt, domesticated plants, and wild plants. Assuming that the animal bones and the plant remains are clues to the relative importance of the several methods by which food was obtained, we have estimated that they garnered something in the order of 195 liters of food from hunting, 42 liters from planting and harvesting domesticated plants, and perhaps 208 liters from collecting wild plants, such as *Agave*, various kinds of grasses, and fruits, that were available to them. Accordingly, about 34 percent of their food came from animals, perhaps 57 percent came from wild plants, and about 9 percent from domesticated plants, such as corn, moschata squash, amaranth, gourd, avocado, black and white sapote, chili, and common beans. Furthermore, about half of a huge cache of chupandilla pits in Area E1

were unusually large, suggesting that this plant had been cultivated. If this were true, the percentage of their diet that came from domesticated and cultivated plants would rise to 18 percent, and the collected, wild plants would account for only 47 percent.

Ten coprolites were preserved in Zone XI. The major food indicated by their contents was pochote, and in one coprolite a co-dominant was organ cactus. In 3 of the coprolites the co-dominant was *Setaria* or fox-tail grass and meat. Tissues and seeds of other cactus were found, and there were remains of chili pepper and black sapote, besides. In one of the coprolites, meat was the co-dominant material, with pochote. In the Zone XI coprolites there was no evidence of maize having been eaten.

On the basis of the distributions of artifacts and of ecofacts, we identified several activity areas on this floor (Fig. 118). Perhaps the most clearly defined was that in the easternmost portion of the site, extending from E4 to E15 and from north of the 0 east-west line to the S3 line. It was labeled Activity Area A, and subsequently divided into two subareas, A1 and A2, because of a gap in the distribution of data around the E11 line. Area A2, which lay to the east of the dividing line, contained a greater preponderance of bones representing small mammals, than did Area A1, west of the line, while both contained abundant deer remains. Also, Area A2 contained a large number of end-scrapers, while the side-scraper was more commonly found in Area A1; additionally, Area A1 contained a concentration of bifaces, spokeshaves, wooden tools, plus an antler-tine flaker and a piece of string—all of which set it apart from Area A2. A distinctive aspect with regard to the deer remains, especially in Area A1, was the presence of many large, intact deer bones such as would never have survived the El Riego butchering techniques testified to by remains from the earlier occupation levels of this rock shelter, Zone XII excepted. Due to the large number of projectile points (10 Tila, 5 Trinidad, 8 Coxcatlan, 2 Agate Basin, 2 Abasolo, 2 San Nicolas, and 1 Palmillas from Area A1; seven others from A2), in Area A1 particularly, and the presence of deer remains, associated also with side-scrapers, we guess that Area A1 was one devoted chiefly to activities related to the hunt, especially butchering. Plant remains, along with numerous grinding artifacts, were found in this area as well; also many flint chips and cores, including imported obsidian, occurred, evidencing a flint-knapping industry.

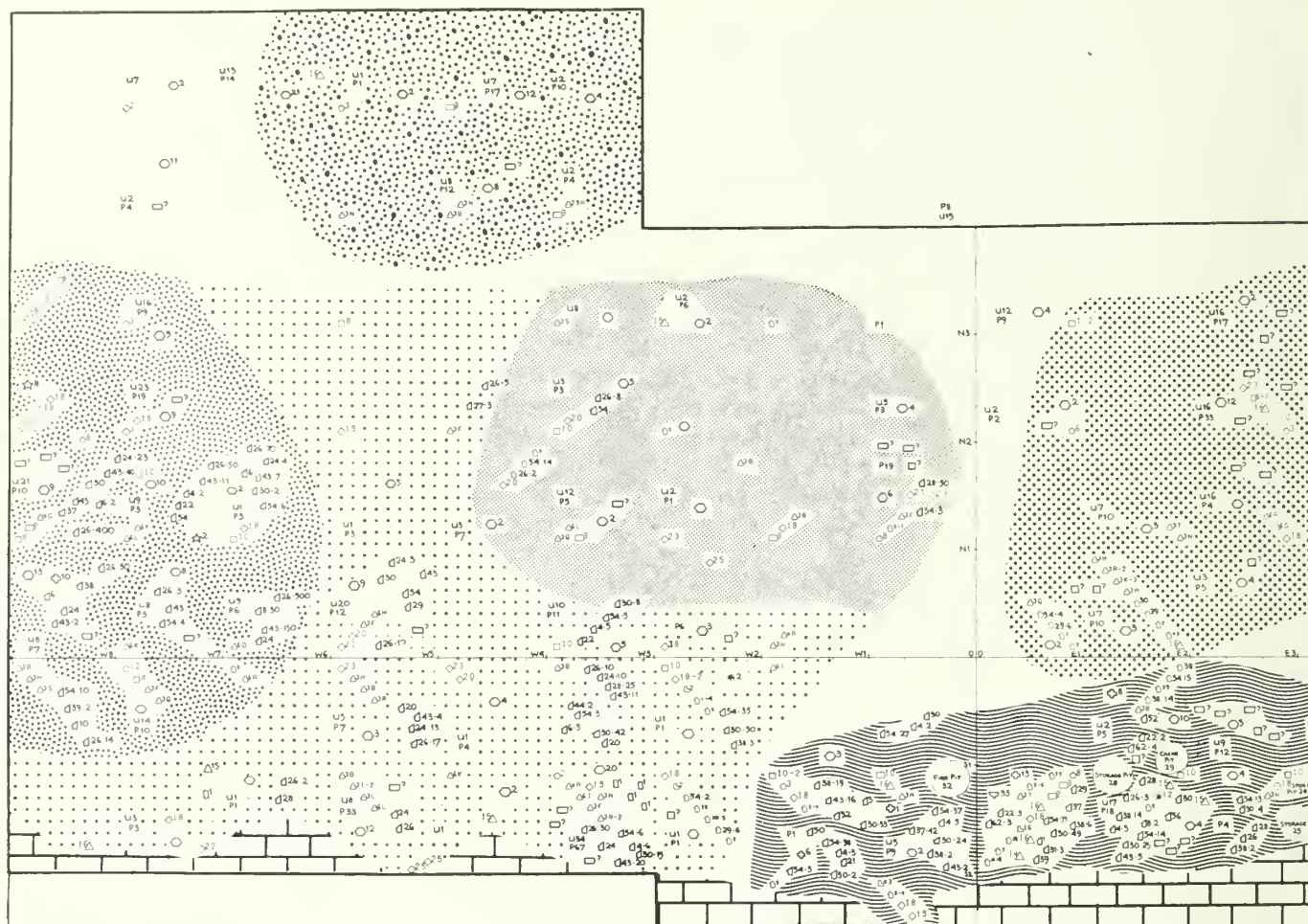
In fact, from Square S2E9 were recovered 9 obsidian cores, whose analysis indicated they had been brought from the Orizaba region—good evidence that the di-

rect procurement system of exchange was still in current use. Perhaps also imported from the lowlands by means of this system were such plants as common beans, black and white sapote, gourd, and moschata squash—also, the idea of cultivating these plants.

Besides the evidence for their concern with hunting, butchering, collecting and preparing plant foods, flint knapping, and exchanging foreign goods, there was also the evidence of string-making, woodworking and skin-working. The spokeshaves, and the atlatl parts, bark, and wood indicated woodworking; the antler-tine flaker or antler-awl, in association with some end-scrapers, blades, side-scrapers, and bones of fur-bearing animals, indicated not only skin preparation, but the tailoring of these skins. All in all, the group who dropped the artifacts and ecofacts in Area A1 seems to have had a well-rounded life. This is in apparent contrast with the group whose activities were reflected by the finds in Area A2.

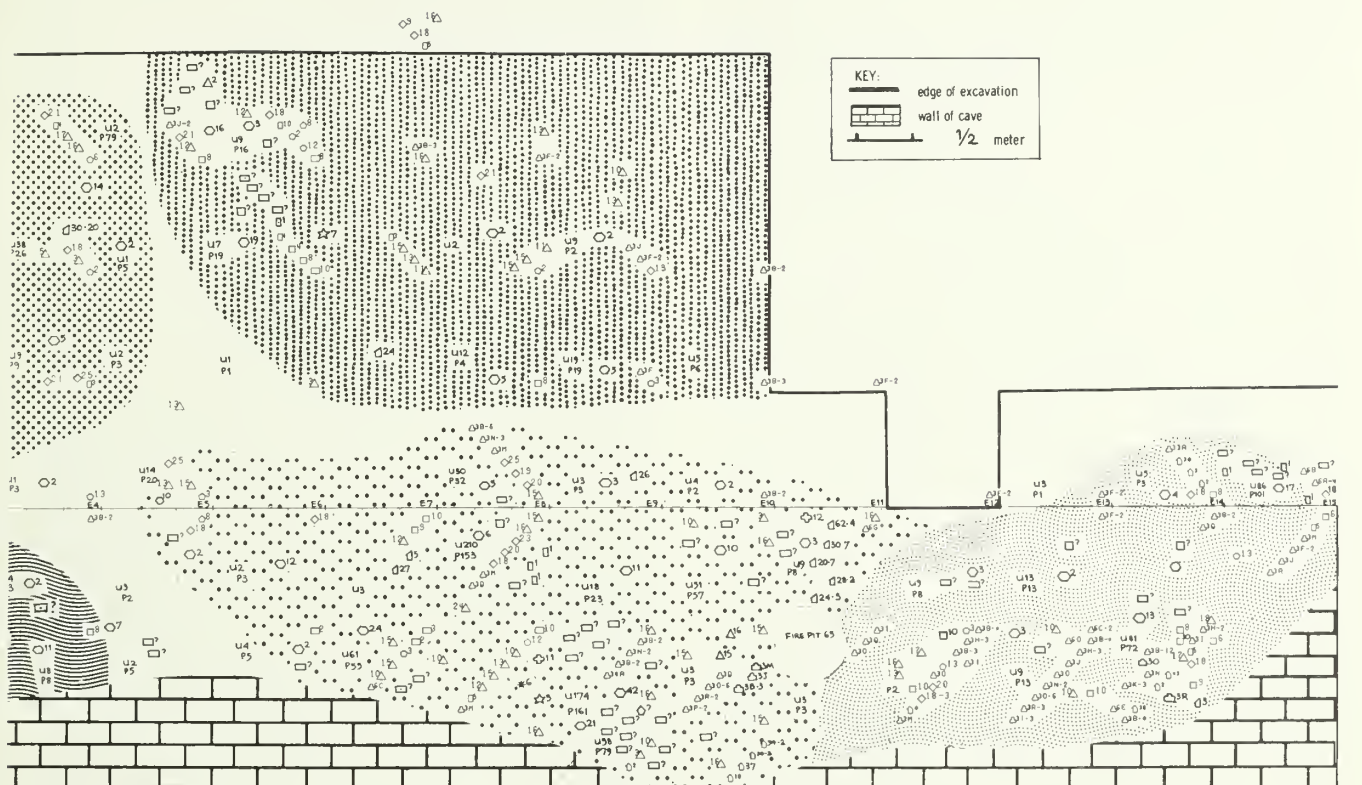
Activity Area A2 where end-scrapers, scraper-planes, projectile points—2 Almagre, 1 San Nicolas, 1 Coxcatlan, 1 Garyito, and 2 Trinidad—and a larger number of small mammal remains were found, suggested a hunting or trapping area and skin-working locus. The plants, in association with grinding stones, showed a concern with plant collecting and processing. Some flint-knapping may have occurred also, but little else. Whether this portion of Area A represents an occupation by a separate group carrying on more limited and specialized activities, or whether it represents merely the more specialized activity of one group living over the whole area, is difficult to tell. Activity Area A, however, in both parts, probably represents a unified activity area centering around the fire pit, feature No. 65, with the distributions of artifacts and bones representing separate activities carried on at the same time, by different members of the group.

Area B was defined by the clustering of projectile points, blades, bifaces, end-scrapers, side-scrapers, and grinding stones, along with a bone tool, in the area covering the northeast corner of the excavation, from E4 to E10 and from N1 to N4. There were very few animal remains here. The bifaces were largely choppers, in contrast with those found in Activity Area A that were primarily thin, ovoid, or square-based bifaces. This activity area also contained a relatively large number of manos, metates, and muller fragments, as well as a stone bowl. As in Area A, though perhaps on the smaller scale of A2, there seems to have been, in Area B, a primary concern with hunting, butchering, and skin preparation, a little plant preparation, and some flint-knapping. Moreover, Area B lay just north



<p>Spring - winter macroband occupation 28</p> <p>Activity Area A1</p> <p>Hunting and butchering activities</p> <ul style="list-style-type: none"> 3 Abasco 10 Trinidad 12 Agate Basin 13 San Nicolas 15 Tila 16 Coscallan 24 Palmitas 38 other, white-tailed deer 30 vertebra, white-tailed deer 31 tibia, white-tailed deer 33M ulna, white-tailed deer 36 radius, white-tailed deer 39 scapula, white-tailed deer 38 ramus, mandible, white-tailed deer 30 petrous bone, white-tailed deer 46C tibia, cottontail 46C radius, cottontail 34A fish 11 pointed end, atlatl shaft fragment 12 blunted end, atlatl shaft fragment <p>Skin preparation</p> <ul style="list-style-type: none"> 1 end scraper fragment 9 thin-flake end scraper 10 crude, discoidal end scraper 1 crude blade fragment 5 crude blade, pointed platform 7 chopper fragment 3 flake chopper 8 pebble chopper 12 thin, crude, ovoid blade 10 thin flake side scraper, one edge retouched 5 antler-tine flake <p>Plant preparation</p> <ul style="list-style-type: none"> 18 mullet or mano fragment 19 metate fragment 20 boulder metate-milling stone 25 ovoid mano 25 oblong mano 2 setaria cf. macrostachya 5 zea mays imazei 10 acacia spp. seeds 20 prosopis juliflora seeds imesquelet 		<p>46C cyrtocarpa procera ichupanditai</p> <p>27 spondias mombin ficiuetai</p> <p>28 condalia mexicana</p> <p>30 cenba parviflora pods ipocholai</p> <p>37 myrtillocactus geometrizans igarambuloi</p> <p>54 agave spp. seeds</p> <p>62 liandusa spp. leaves</p> <p>Woodworking</p> <ul style="list-style-type: none"> 2 spokeshave-like tool 13 flake graver 11 pointed end, atlatl shaft fragment 12 blunted end, atlatl shaft fragment <p>String-making</p> <ul style="list-style-type: none"> 6 2-ply coarse cord, 2-twist lagavei <p>Flint knapping</p> <ul style="list-style-type: none"> cores U number of flakes without platforms per square P number of flakes with platforms per square <p>Activity Area A2</p> <p>Hunting, trapping and skin preparation</p> <ul style="list-style-type: none"> 10 Trinidad 13 San Nicolas 16 Coscallan 17 Almagre 18 Gariyol 38 other, white-tailed deer 30 vertebra, white-tailed deer 31 metapodial, white-tailed deer 36 astragalus, white-tailed deer 31 calcaneum, white-tailed deer 33 tibia, white-tailed deer 36 femur, white-tailed deer 38M ulna, white-tailed deer 36 radius, white-tailed deer 30 huierus, white-tailed deer 30 petrous bone, white-tailed deer 38 ramus, mandible, white-tailed deer 31 antler, white-tailed deer 46A other, cottontail <p>Flint knapping</p> <ul style="list-style-type: none"> cores U number of flakes without platforms per square P number of flakes with platforms per square 		<p>46C callanum, cottontail</p> <p>46C tibia, cottontail</p> <p>46C femur, cottontail</p> <p>46C innominate, cottontail</p> <p>7A fragment, recent jackrabbit</p> <p>33A bird</p> <p>1 crude blade fragment</p> <p>5 crude blade, pointed platform</p> <p>7 side scraper fragment</p> <p>7 end scraper fragment</p> <p>8 gouge</p> <p>2 slab chopper</p> <p>3 flake chopper</p> <p>8 pebble chopper</p> <p>3 flake chopper</p> <p>13 thin, crude, square-based blade</p> <p>Plant collecting and processing</p> <ul style="list-style-type: none"> 18 mullet or mano fragment 20 boulder metate-milling stone 6 flat-topped scraper-plane 2 setaria cf. macrostachya 25 ovoid mullet 5 zea mays imazei 38 prosopis spp. leaves sprickly peari 43 sideroxylon cf. Tempisque lcosahucoi <p>Flint knapping</p> <ul style="list-style-type: none"> cores U number of flakes without platforms per square P number of flakes with platforms per square <p>Activity Area B</p> <p>Hunting and butchering activities</p> <ul style="list-style-type: none"> 2 Lerma 10 Trinidad 11 La Mina 12 Agate Basin 13 San Nicolas 16 Coscallan 38 other, white-tailed deer 36 metapodial, white-tailed deer 31 tibia, white-tailed deer 		<p>Skin preparation and tailoring</p> <ul style="list-style-type: none"> 1 crude blade fragment 4 crude blade, unprepared platform 4 crude blade, prepared platform 5 crude blade, pointed platform 10 line blade, ground platform 7 side scraper fragment 10 thin flake side scraper, one edge utilized 10 thin flake side scraper, one edge retouched 7 end scraper fragment 4 crude, long, flat-flake end scraper 8 gouge 2 slab chopper 3 flake chopper 8 pebble chopper 12 thin, crude, ovoid blade 7 round antler needle <p>Plant preparation</p> <ul style="list-style-type: none"> 9 leonate bowl 18 mullet or mano fragment 19 metate fragment 20 boulder metate-milling stone 25 ovoid mullet 24 jaltipha neopaulicora <p>Flint knapping</p> <ul style="list-style-type: none"> cores U number of flakes without platforms per square P number of flakes with platforms per square <p>Activity Area C</p> <p>Hunting, butchering and skin preparation</p> <ul style="list-style-type: none"> 14 Abejas 15 Tila 16 Coscallan 38 other, white-tailed deer 33M ulna, white-tailed deer 36 radius, white-tailed deer 30 huierus, white-tailed deer 30 petrous bone, white-tailed deer 38 ramus, mandible, white-tailed deer 31 antler, white-tailed deer 36 metapodial, white-tailed deer 31 tibia, white-tailed deer 		<p>Seed preparation and storage</p> <ul style="list-style-type: none"> 18 mullet or mano fragment 19 metate fragment 1 dijon edule 3 unidentified grass seed 4 grass quids 5 zea mays imazei 1 persea americana lavacodol 20 prosopis juliflora seeds imesquelet 21 prosopis juliflora seeds imesquelet 22 casimira edulis white bean 26 cyrtocarpa procera ichupanditai 28 condalia mexicana 29 cenba parviflora pods ipocholai 30 cenba parviflora pods ipocholai 31 cephalocereus hoppersedethi itetechol 37 myrtillocactus geometrizans igarambuloi 38 prosopis spp. leaves sprickly peari 39 prosopis spp. seeds sprickly peari 43 sideroxylon cf. Tempisque lcosahucoi 40 c. moschata 32 laonaria scieraria bottle gourd 34 agave spp. seeds 36 agave spp. seeds 42 liandusa spp. leaves 40 plumeria rubra ifrangiamti <p>Woodworking</p> <ul style="list-style-type: none"> 2 spokeshave-like tool 13 flake graver 11 pointed end, atlatl shaft fragment 12 blunted end, atlatl shaft fragment <p>Textile activities</p> <ul style="list-style-type: none"> 33 interlocking and split stitched, coiled basket 12 coarse yarn, 2-twist (basil) 16 slip knot, ragavei 43 granny knot, in hard fibers without loops <p>Flint knapping</p> <ul style="list-style-type: none"> end scraper fragment 10 crude, discoidal end scraper cores U number of flakes without platforms per square P number of flakes with platforms per square
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Fig. 118. Activity areas of Zone XI of Tc 50, with a key to their artifacts and ecofacts.



Activity Area 0 • Hunting, butchering and skin preparation 5 El Riego 16 Coccalan 17 Almagre 38 other, white-tailed deer 3K lemur, white-tailed deer 3M uina, white-tailed deer 3H radius, white-tailed deer 30 humerus, white-tailed deer 30 petrous bone, white-tailed deer 3R ramus, mandible, white-tailed deer 3F antler, white-tailed deer 6A other, cottontail 6L radius, cottontail 3 crude blade, unprepared platform 4 crude blade, prepared platform 5 crude blade, pointed platform 7 side scraper fragment 10 thin flake side scraper, one edge retouched 2 slab chopper 3 flake chopper 6 ellipsoidal chopper Plant processing 18 mullet or mano fragment 21 ovoid mullet 23 ovoid mano 25 oblong mano 2 silaria cf. macrostachya 3 unidentified grass seeds 29 ceiba parvifolia pods (pochote) 30 sideroxylon cf. tempsique (cosahuico) 54 agave spp. quids	Flint knapping 3 Anasolito 3 cores U number of flakes without platforms per square P number of flakes with platforms per square Activity Area E • Hunting and butchering activities 15 Tilapa 16 Coccalan 38 other, white-tailed deer 3H radius, white-tailed deer 30 humerus, white-tailed deer 30 petrous bone, white-tailed deer 3R ramus, mandible, white-tailed deer 3F antler, white-tailed deer 6A other, peccary 6K scapula, cottontail 6L radius, mandible, cottontail 6L metapodial, cottontail 3 crude blade fragment 7 end scraper fragment 10 crude, discoidal end scraper 1 crude blade fragment 2 slab chopper 3 cores U number of flakes without platforms per square P number of flakes with platforms per square	Plant collecting and preparation 18 mullet or mano fragment 19 metal fragment 20 boulder metal-milling stone 21 ovoid mullet 22 boulder trough metal 23 ovoid mano 25 oblong mano 38 azadir, hammerstone 4 grass quids 5 zea mays (maize) 6 acrocomia mexicana (coyol) 22 prosopis juliflora seeds (mesquite) 22 cassimira edulis (white bean) 24 jatropa neopasciflora 26 cyrtocarpa procerca (chupandilla) 27 spondias mombin (licuala) 28 condalia mexicana 29 ceiba parvifolia pods (pochote) 30 sideroxylon cf. tempsique (cosahuico) 44 diospyros digna (black sapote) 54 agave spp. quids * 2 4-ply coarse rope, 2-twist (agave) 2 overhand knot (basi)	Activity Area E1 • Hunting, trapping, butchering and skin preparation 10 snake part 38 other, white-tailed deer 3H radius, white-tailed deer 30 petrous bone, white-tailed deer 3F teeth, white-tailed deer 4G scapula, peccary 6A other, cottontail 6K scapula, cottontail 6L metapodial, cottontail 2 split-bone awl, proximal ends 3 crude blade, unprepared platform 3 flake chopper 6 pebble chopper 12 thin, crude, ovoid biface 3 crude, ovoid, plano-convex end scraper 10 crude, discoidal end scraper Plant food processing 3 tecamate mortar 18 mullet or mano fragment 5 domed scraper-plane 4 grass quids 5 zea mays (maize) 6 acrocomia mexicana (coyol) 8 persea americana (avocado) 10 acacia spp. seeds 22 cassimira edulis (white bean) 24 jatropa neopasciflora 26 cyrtocarpa procerca (chupandilla) 29 ceiba parvifolia pods (pochote) 30 sideroxylon cf. tempsique (cosahuico) 37 mytillocactus geometrizans (garambulito) 38 opuntia spp. leaves (prickly pear) 39 opuntia spp. seeds (prickly pear) 43 sideroxylon cf. tempsique (cosahuico) 44 capsicum annuum (chili pepper) 54 agave spp. quids	Woodworking 8 gouge 7 side scraper fragment 2 spokeshave-like tool 10 snake part Flint knapping 3 cores U number of flakes without platforms per square P number of flakes with platforms per square Activity Area E2 • Butchering 15 Tilapa 38 other, white-tailed deer 3H radius, white-tailed deer 30 petrous bone, white-tailed deer 3F teeth 6L metapodial, white-tailed deer 3 cores U number of flakes without platforms per square P number of flakes with platforms per square Skin preparation 7 side scraper fragment 3 flake graver 7 end scraper fragment 10 crude, discoidal end scraper 8 pebble chopper Plant collecting and processing 18 mullet or mano fragment 20 boulder metal-milling stone 21 ovoid mullet 23 ovoid mano 25 oblong mano 5 zea mays (maize) 26 cyrtocarpa procerca (chupandilla) 28 condalia mexicana 30 ceiba parvifolia pods (pochote) 54 agave spp. quids	Activity Area E3 • Hunting and butchering activities 16 Coccalan 38 other, white-tailed deer 3H radius, white-tailed deer 3F antler 3 flake chopper 7 side scraper fragment 3 flake graver 3 cores U number of flakes without platforms per square P number of flakes with platforms per square
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of the large hearth (feature No. 65). So again the question arises as to whether B was actually a separate area from A1 and A2; and, if not, in what way related? There remains the distinct possibility that all three areas represent distinct biologic groups who shared a common hearth.

Activity Area C was defined by a heavy distribution of plant remains, animal bones, and artifacts within the area from W2 to E4 and between the 0 east-west axis and S2. This included an abundance of preserved plant remains, a concentration of 2 *Tilapa* points, 3 Coxcatlan types, and an Abejas projectile point, a slight presence of bones (largely deer, but some cottontail), and a number of end- and side-scrapers and choppers. The side-scrapers included spokeshaves and graters, and the end-scrapers were crude discoids that could have been cores and were associated with some chips. Thus, the people working in this locality might have been engaged in woodworking, skin-working, and flint-knapping. Whether they were storing their kill here or butchering it here is difficult to determine, but we do know that cooking was definitely done in Fire Pit 32 in Square S2.

Area C clearly was a seed storage and preparation area, and probably every kind of implement found here, from the chipped and ground stone tools to the ropes and basket, had been involved in plant collecting and its related tasks. Encompassing 3 storage pits (feature Nos. 24, 25, 26) and a cache pit (29), as well as a fire pit (No. 32), Area C was also the area where the largest amount of maize remains were recovered. It probably is significant that, in this area of the richest concentration of plant remains, was found the smallest number of tools. It suggests a storage area rather than a locus of food processing. Only a few mano and metate fragments and two choppers were found in this activity area. There was some yarn, string, rope, knots, and a basket that may have been used as a container for carrying seeds and plants. These may, otherwise, be evidences of a textile industry centered here. Thus, this region, like Area A1, seems to represent a living area of a group who engaged in a wide range of activities.

Just north of Area C, lying east of the 0 axis, stretching between 0 and N3, as far as E4, was a concentration of artifacts which has been designated as Activity Area D, but which may indeed have been simply a part of Activity Area C. In this area were bones of deer and cottontail rabbit, also, 6 projectile points—1 El Riego and 1 Almagre, an Abasolo (preform?), and 3 Coxcatlan types. Other artifacts found included grinding stones, a few choppers, scrapers, and blades, as well as substantial plant remains. One might almost

get the impression that, since deer and other animal bones were deposited here, perhaps the projectile points were in the carcasses of the animals; however, other activities, such as butchering, skin-preparation, plant-processing, and flint-knapping, might have been undertaken in Area D. Thus, Area D was much like Areas A2 and B.

Activity Area E, to the west of Activity Areas C and D, was defined by the concentration of deer bones and Audubon cottontail spread over the western half of the site. This area extended fully from the 0 north-south axis to the western limits excavated and from the N3 line to the southern limits excavated. There were very few projectile points, which was surprising in view of the rather large amount of deer remains and flint chips and cores. It also constitutes a clear difference between the western and eastern halves of the zone.

This area has been subdivided into smaller activity areas that seem to be more meaningful, or, at least, better define the broad area just delimited. Activity Area E1, in the northwestern corner of E, covered from S1 to N4 and from W6 to W9. Lying outside of the general concentration of animal bones, it seemed to be a concentration of tools associated with plant food processing activities. It contained scraper-planes, choppers, side- and end-scrapers, a muller, and a tecomate mortar, as well as abundant and varied plant remains. Yet, the blades, choppers, and side- and end-scrapers, plus the bone awls, in association with bones of deer, rabbit, and peccary, were strong indications that, in addition, they were working skins. Also, there was a wooden snare part in association with spokeshaves and gouges, as well as with chips and cores: probably both woodworking and flint-knapping occurred here. Again, the lack of projectile points in this area clearly distinguished it from others on this floor.

The main part of Area E, in fact, what was left after E1 and E2 were carved out of it, and which remains labeled Area E, included the southern section between W6 and W1 from the cave wall to roughly N1. This subdivision contained the largest concentration of manos, metates, and mullers of the entire occupation floor. Furthermore, one of the large concentrations of preserved plant materials from this zone was found in these squares. Fragments of string and knots, as well as *Agave* quids, indicated that not all these plants were used only for food, but some were utilized in string-making and perhaps textiles. Area E included, in addition, some projectile points and deer, rabbit, and peccary bones, but few tools for the preparation of the meat or skin of these animals. Chips and cores may indicate flint-knapping occurred here.

Area E2 to the northeast, roughly between the 0-0 axes and W4, to the N4 line, contained fewer artifacts, but of these, again grinding tools and plant remains predominated. Only 1 point, a Tilapa, was present, together with a few deer bones and a single cottontail rabbit bone. The side- and end-scrappers, biface, and graver did, however, indicate that some butchering and/or skin preparation occurred here. There was even less evidence for flint-knapping. As throughout the rest of Area E, including Area E1, plants and their processing received the greatest attention in Area E2.

One factor that caused confusion in evaluating Activity Area E was that, in some portions of it were two floors noted within Zone XI. It was not possible to attribute specific artifacts to either of these floors, since they were not continuous, but we wish to note, as pertinent to this confusion, that Area E included many fall and some winter plants, suggesting the possibility of other small occupations, in a different year, perhaps.

A small activity area, F, was located between the N4 and N6 lines from W7 to W3; it contained deer (and lizard) remains, side-scrappers, a Coxcatlan projectile point, and 1 flake chopper, and was obviously related to hunting and to the processing of meat and plant foods.

The general impression gained from studying the distribution of plant remains, animal bones, and artifacts on this floor is that the main living area was close to the wall of the rock shelter; that is, for the most part, along the S1 line where the features were located. This is indicated particularly by Activity Areas A, C, and E. The other activity areas wheeled about these major living areas, representing both hunting and plant food processing activities. This disposition of the site was particularly evident in the pattern of, for instance, grinding tools, such as the boulder metates, the tecomate bowls, the mullers, and so forth, which were distributed in an almost even arc around the focal feature areas, ranging from Square S2W7 up to the area of 0N2 and back down to S2E14.

Finally, it is tempting to suggest that the western portion of the floor, from E5 west, represented a central living area where all of the major activities were carried on, while the eastern half, from E5 to E15, represented an area of the site more or less reserved as a depot for meat brought in from the hunt to be processed there.

The artifacts indicated that this multi-seasonal macroband Occupation 24 was a Coxcatlan Phase component. Three Carbon-14 dates from Activity Areas E and A gave us an average date of 4121 ± 96 B.C. (I-567,

I-664, M-1089, I-459) (*Radiocarbon* 11:89, 91, 96; 4:200) for Zone XI.

The Way of Life of Zone X

Occurring mainly in the eastern half of the area excavated, from E1 to E15 between the S2 and N4 lines, Zone X housed the first occupation attributed to the Abejas Phase of the Tehuacan Valley sequence. The zone was pinkish-gray in color and composed of compact ash with a thin floor (No. 15) capping it. It was disturbed by feature No. 1 and feature No. 6 dug from higher zones. In the easternmost portions, this floor was thicker and composed of well-preserved plant remains; to the west it pinched out and faded into the top of Zone XI between the 0 and E1 grid lines. This is just about the point where the eastern ends of underlying Zones XII and XIII disappeared, and so, in the field notes, as well as in the preliminary analysis of the artifact types, the four zones were correlated with one another in different manners. This, of course, affected the zonal assignment of some specimens of the various artifact types in the east end, not only in Zones X and XI, but also in the overlying Zones IX and VIII, as well as in the underlying Zones XIV through XXII. In fact, the number of specimens affected was so small that it did not materially change the percentile trends of the artifact types; but it did mean that the exact numbers of artifacts for each of these zones are, in these site descriptions, slightly different from those found in the earlier volume describing the non-ceramic types. The numbers of artifacts for these zones given here, we believe, are now the correct ones, while, generally speaking, the percentile trends described previously remain basically the same.

In spite of the elusive boundaries of Zone X, from preserved plant and animal remains we located several activity areas that indicated an almost year-round occupation of the floor, or alternatively, intermittent visits to the cave throughout the year (Fig. 119). These plant and animal remains, few as they were, did suggest that, while the occupants' diet was primarily (49 percent) of food from wild plants, some of it came from wild animals (29 percent), with almost as much from cultivated or domesticated plants (21 percent). There were also the remains of a domesticated dog who may have been something more than man's best friend; he may also have been part of his dinner, in which case, the meat would have represented about 1 percent of the diet.

A study of the distribution of ecofacts and artifacts, in particular, the points and bones, revealed four well-defined activity areas. There was some indication that

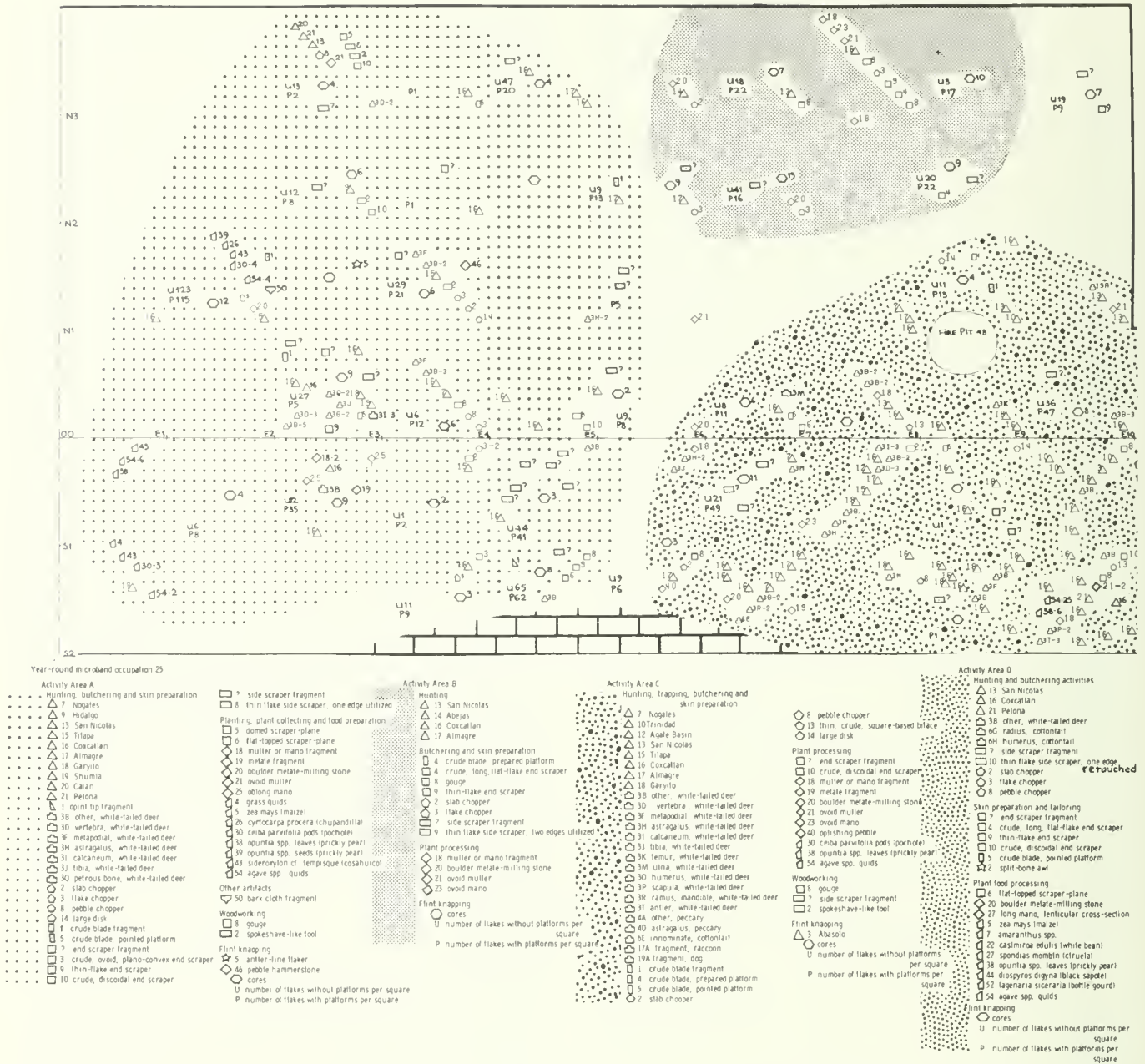
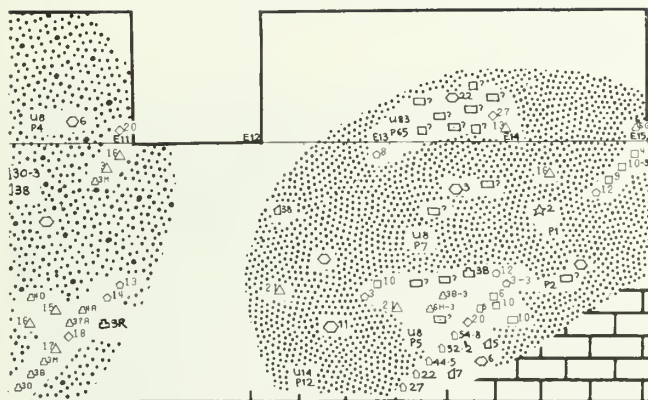
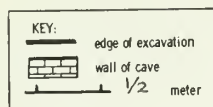


Fig. 119. Activity areas of Zone X of Tc 50.

the actual occupation extended some distance both to the north and to the east of our excavation.

Activity Area A was the area extending between 0 and E5 from S2 to N4. It contained a relatively heavy concentration of projectile points, largely Coxcatlan (16); 2 Garyito, 3 Tilapa, 2 Almagre, a Hidalgo, a San Nicolas, a Pelona, a Catan, a Nogales, and a Shumla also were uncovered. Furthermore, this was

the area where deer bones were found, exclusive of other animal bones, and side-scrapers, spokeshaves, a gouge, and end-scrapers were found in numbers that contrasted with the other activity areas to be described. Mullers, metates, manos, flake choppers, and scraper-planes that were perhaps cores also were present, with many flint chips, a hammerstone, and an antler-tine flaker. We get the impression that a wide



variety of activities were undertaken in this vicinity. We found evidence not only of hunting and meat food preparation, plant collecting, and planting, but also of woodworking, flint-knapping, and hide-working. These are the kinds of activities that one could expect a family-like unit to undertake to sustain life during either a prolonged encampment or a series of repeated visits to the cave, over an annual period.

Activity Area B covered the area from N2 to N4 between E5 and E9, but it probably extended well north of our excavation. It contained an Abejas, a San Nicolas, an Almagre, and a Coxcatlan point, but no animal remains. The scrapers were predominantly end-scrapers; choppers, gouges, manos, and metates, as well as many flint chips, were also found in this area. Again, a number of interrelated activities, such as preparing meat obtained from the hunt, collecting and processing plants, skin preparation, and flint-knapping, probably were undertaken in this locus.

Activity Area C extended from E5 to E11, south of Area B between the S2 and N2 lines. It contained a fire pit, feature No. 48, which not only was large enough, but also contained clear evidence, to have served as a roasting pit. The preponderance of projectile points found in Zone X were concentrated in Area

C—largely Coxcatlan points (32), and including Garyito (7), Tilapa (2), Almagre (6), Trinidad (5), Nogales (4), Abasolo (1), Agate Basin (1), and San Nicolas (4). The area contained few gouges, a spoke-shave, comparatively few end- and side-scrapers, but many cores and chips. There were only 2 choppers. Thin percussion flake bifaces were present, and some of these may have been preforms or quarry blanks. The Abasolo point also may have been a preform. There were metates and mullers, manos, and a polishing pebble. The last 3 types probably served also as hammerstones; they were found in association with an antler that could have been a flaker, as well as hundreds of flakes, core fragments, and scraper-plane cores. There included a large cache of obsidian cores and flakes in Square E10, which probably were obtained by the direct procurement method of exchange. The large amount of projectile points, chips, and flaking tools suggests that this area was the manufacturing center of projectile points and that, while these flint-knappers made Coxcatlan points, they also specialized in Garyito, Trinidad, and Almagre types, in contrast to Area A where Coxcatlan types were sharply predominant. Again, however, a full range of family activities was practiced, as indicated by the various seed-grinding tools, butchering tools, woodworking tools, and hide-working tools.

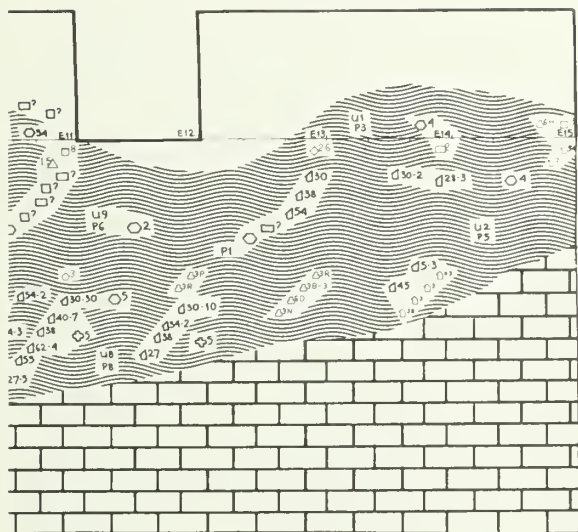
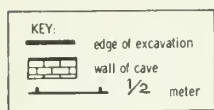
The fourth Activity Area, D, covered the area of the squares from S2 to N1 between E12 to E14, and probably extended well to the north beyond the limits of the excavation. There were some preserved plant remains, including amaranth and corn, in this area, along with some tools associated with the processing of these plant foods—choppers, and fragments of manos and metates. Four projectile points—2 Pelona, a Coxcatlan, and a San Nicolas—came from this area, and only a few rabbit and deer bones. Crude, discoidal end-scrapers and a bone awl, as well as many chips, were found, indicating skin-working and flint-knapping. This Pelona point-making family was also involved in the full range of other necessary tasks, like the other groups.

The artifacts suggested this occupation (or occupations) numbered Occupation 25 took place in Early Abejas times, and the Carbon-14 date of 3075 ± 180 B.C. (I-654) (*Radiocarbon* 11:90) concurred with this conclusion. It seems a whole new way of life now existed in the valley: larger groups lasted longer, and within the groups evolved increased specialization of activities. Some sort of new exchange system was establishing itself between seasonal camps, as well as among the longer-enduring occupations.



Winter fall macrobiotic occupation 26

Activity Area A		Activity Area B		Seed preparation		Hunting	
Hunting and trapping		Hunting and trapping		18. mullet or mango fragment		10. Trinidad	
3. Abasco		15. Tilapa		26. ovoid, plano-convex metal		14. Abasco	
16. Coxcallan		16. Coxcallan		40. polishing pebble		15. Tilapa	
21. Pelona		18. Gariyo		2. setaria cf. macrostachya		16. Coxcallan	
14. Temur, white-tailed deer		21. Pelona		3. unidentified grass seeds		17. Amagre	
6A. other, cottontail		3A. felus, white-tailed deer		4. grass quids		18. Gariyo	
6B. innominate cottontail		3B. other, white-tailed deer		5. zea mays maize		19. point of fig fragment	
6C. ramus, mandible cottontail		3C. metapodil, white-tailed deer		6. acrocoma mexicana coyoti		3A. felus, white-tailed deer	
Skin preparation		3D. astragalus, white-tailed deer		7. amarantus spp.		3B. other, white-tailed deer	
1. crude blade fragment		3E. calcaneum, white-tailed deer		8. persia americana favocoid		3C. rib, white-tailed deer	
2. end scraper fragment		3F. libia, white-tailed deer		20. prosopis juliflora seeds mesquite		30. vertebra, white-tailed deer	
3. crude, keeled end scraper		3G. temur, white-tailed deer		22. casimiroa edulis white bean		38. metapodil, white-tailed deer	
4. crude, long, flat-flake end scraper		3H. radius, white-tailed deer		24. jaliscoa neopacifica		38. other, white-tailed deer	
5. gouge		3I. scapula, white-tailed deer		27. spondias mombin icruetari		3C. rib, white-tailed deer	
6. thin-flake end scraper		3J. ramus, mandible, white-tailed deer		28. condalia mexicana		3N. radius, white-tailed deer	
7. crude, discoidal end scraper		3K. humerus, cottontail		29. celia parvifolia pods ipocher		37. antler, white-tailed deer	
8. thin, crude, ovoid blade		3L. innominate, cottontail		30. celia parvifolia pods ipocher		6B. innominate, cottontail	
Butchering		3M. ulna, cottontail		34. lemniscocereus hollianus stem		1. crude blade fragment	
1. side scraper fragment		3N. humerus, cottontail		38. opuntia spp. leaves prickly pear		3. crude blade, unprepared platform	
2. flake chopper		3O. maxilla, cottontail		40. opuntia spp. fruit prickly pear		4. crude blade, prepared platform	
3. pebble chopper		3P. fragment, fox		43. sideroxylon cf. tempisque cosahuicui		5. crude blade, pointed platform	
4. thin, crude, ovoid blade		3Q. fragment, fish		45. capsicum annuum icbhi poperi		7. end scraper fragment	
Flint knapping		34A. fragment, fish		52. laeternia sicaria ibottle gourd		2. crude, keeled end scraper	
1. cores		Butchering and skin preparation		54. ayape spp. quids		4. crude, long, flat-flake end scraper	
2. number of flakes without platforms per square		1. crude blade fragment		62. tillandsia spp. leaves		8. thin-flake end scraper	
3. number of flakes with platforms per square		2. crude blade, prepared platform		Woodworking		10. crude, discoidal end scraper	
4. number of flakes without platforms per square		3. crude discoidal end scraper		1. gouge		1. thin flake side scraper, one edge retouched	
5. number of flakes without platforms per square		4. crude, long, flat-flake end scraper		2. spoke shave, like tool		2. thin flake side scraper, one edge utilized	
6. number of flakes without platforms per square		5. thin flake end scraper		3. large pointed stick		3. split-bone awl	
7. number of flakes without platforms per square		6. crude discoidal end scraper		4. blunt end, allati foreshell fragment		4. number of flakes without platforms per square	
8. number of flakes without platforms per square		7. side scraper fragment		String making		5. number of flakes with platforms per square	
9. number of flakes without platforms per square		8. thin flake side scraper, one edge retouched		1. 2-ply coarse cord, 2-twist lagave		6. number of flakes without platforms per square	
10. number of flakes without platforms per square		9. flake chopper		2. 2-ply coarse cord, 2-twist lagave		7. number of flakes without platforms per square	
11. number of flakes without platforms per square		10. thin flake side scraper, one edge utilized		3. 2-ply coarse cord, 2-twist lagave		8. number of flakes without platforms per square	
12. number of flakes without platforms per square		11. pebble chopper		4. 2-ply coarse cord, 2-twist lagave		9. number of flakes without platforms per square	
13. number of flakes without platforms per square		12. thin, crude, ovoid blade		5. 2-ply coarse cord, 2-twist lagave		10. number of flakes without platforms per square	
14. number of flakes without platforms per square		13. thin, crude, square based blade		6. 2-ply coarse cord, 2-twist lagave		11. number of flakes without platforms per square	
15. number of flakes without platforms per square		14. large disk		7. 2-ply coarse cord, 2-twist lagave		12. number of flakes without platforms per square	
16. number of flakes without platforms per square		15. thin flake side scraper, one edge utilized		8. 2-ply coarse cord, 2-twist lagave		13. number of flakes without platforms per square	
17. number of flakes without platforms per square		16. thin flake side scraper, one edge utilized		9. 2-ply coarse cord, 2-twist lagave		14. number of flakes without platforms per square	
18. number of flakes without platforms per square		17. thin flake side scraper, one edge utilized		10. 2-ply coarse cord, 2-twist lagave		15. number of flakes without platforms per square	
19. number of flakes without platforms per square		18. thin flake side scraper, one edge utilized		11. 2-ply coarse cord, 2-twist lagave		16. number of flakes without platforms per square	
20. number of flakes without platforms per square		19. thin flake side scraper, one edge utilized		12. 2-ply coarse cord, 2-twist lagave		17. number of flakes without platforms per square	
21. number of flakes without platforms per square		20. thin flake side scraper, one edge utilized		13. 2-ply coarse cord, 2-twist lagave		18. number of flakes without platforms per square	
22. number of flakes without platforms per square		21. thin flake side scraper, one edge utilized		14. 2-ply coarse cord, 2-twist lagave		19. number of flakes without platforms per square	
23. number of flakes without platforms per square		22. thin flake side scraper, one edge utilized		15. 2-ply coarse cord, 2-twist lagave		20. number of flakes without platforms per square	
24. number of flakes without platforms per square		23. thin flake side scraper, one edge utilized		16. 2-ply coarse cord, 2-twist lagave		21. number of flakes without platforms per square	
25. number of flakes without platforms per square		24. thin flake side scraper, one edge utilized		17. 2-ply coarse cord, 2-twist lagave		22. number of flakes without platforms per square	
26. number of flakes without platforms per square		25. thin flake side scraper, one edge utilized		18. 2-ply coarse cord, 2-twist lagave		23. number of flakes without platforms per square	
27. number of flakes without platforms per square		26. thin flake side scraper, one edge utilized		19. 2-ply coarse cord, 2-twist lagave		24. number of flakes without platforms per square	
28. number of flakes without platforms per square		27. thin flake side scraper, one edge utilized		20. 2-ply coarse cord, 2-twist lagave		25. number of flakes without platforms per square	
29. number of flakes without platforms per square		28. thin flake side scraper, one edge utilized		21. 2-ply coarse cord, 2-twist lagave		26. number of flakes without platforms per square	
30. number of flakes without platforms per square		29. thin flake side scraper, one edge utilized		22. 2-ply coarse cord, 2-twist lagave		27. number of flakes without platforms per square	
31. number of flakes without platforms per square		30. thin flake side scraper, one edge utilized		23. 2-ply coarse cord, 2-twist lagave		28. number of flakes without platforms per square	
32. number of flakes without platforms per square		31. thin flake side scraper, one edge utilized		24. 2-ply coarse cord, 2-twist lagave		29. number of flakes without platforms per square	
33. number of flakes without platforms per square		32. thin flake side scraper, one edge utilized		25. 2-ply coarse cord, 2-twist lagave		30. number of flakes without platforms per square	
34. number of flakes without platforms per square		33. thin flake side scraper, one edge utilized		26. 2-ply coarse cord, 2-twist lagave		31. number of flakes without platforms per square	
35. number of flakes without platforms per square		34. thin flake side scraper, one edge utilized		27. 2-ply coarse cord, 2-twist lagave		32. number of flakes without platforms per square	
36. number of flakes without platforms per square		35. thin flake side scraper, one edge utilized		28. 2-ply coarse cord, 2-twist lagave		33. number of flakes without platforms per square	
37. number of flakes without platforms per square		36. thin flake side scraper, one edge utilized		29. 2-ply coarse cord, 2-twist lagave		34. number of flakes without platforms per square	
38. number of flakes without platforms per square		37. thin flake side scraper, one edge utilized		30. 2-ply coarse cord, 2-twist lagave		35. number of flakes without platforms per square	
39. number of flakes without platforms per square		38. thin flake side scraper, one edge utilized		31. 2-ply coarse cord, 2-twist lagave		36. number of flakes without platforms per square	
40. number of flakes without platforms per square		39. thin flake side scraper, one edge utilized		32. 2-ply coarse cord, 2-twist lagave		37. number of flakes without platforms per square	
41. number of flakes without platforms per square		40. thin flake side scraper, one edge utilized		33. 2-ply coarse cord, 2-twist lagave		38. number of flakes without platforms per square	
42. number of flakes without platforms per square		41. thin flake side scraper, one edge utilized		34. 2-ply coarse cord, 2-twist lagave		39. number of flakes without platforms per square	
43. number of flakes without platforms per square		42. thin flake side scraper, one edge utilized		35. 2-ply coarse cord, 2-twist lagave		40. number of flakes without platforms per square	
44. number of flakes without platforms per square		43. thin flake side scraper, one edge utilized		36. 2-ply coarse cord, 2-twist lagave		41. number of flakes without platforms per square	
45. number of flakes without platforms per square		44. thin flake side scraper, one edge utilized		37. 2-ply coarse cord, 2-twist lagave		42. number of flakes without platforms per square	
46. number of flakes without platforms per square		45. thin flake side scraper, one edge utilized		38. 2-ply coarse cord, 2-twist lagave		43. number of flakes without platforms per square	
47. number of flakes without platforms per square		46. thin flake side scraper, one edge utilized		39. 2-ply coarse cord, 2-twist lagave		44. number of flakes without platforms per square	
48. number of flakes without platforms per square		47. thin flake side scraper, one edge utilized		40. 2-ply coarse cord, 2-twist lagave		45. number of flakes without platforms per square	
49. number of flakes without platforms per square		48. thin flake side scraper, one edge utilized		41. 2-ply coarse cord, 2-twist lagave		46. number of flakes without platforms per square	
50. number of flakes without platforms per square		49. thin flake side scraper, one edge utilized		42. 2-ply coarse cord, 2-twist lagave		47. number of flakes without platforms per square	
51. number of flakes without platforms per square		50. thin flake side scraper, one edge utilized		43. 2-ply coarse cord, 2-twist lagave		48. number of flakes without platforms per square	
52. number of flakes without platforms per square		51. thin flake side scraper, one edge utilized		44. 2-ply coarse cord, 2-twist lagave		49. number of flakes without platforms per square	
53. number of flakes without platforms per square		52. thin flake side scraper, one edge utilized		45. 2-ply coarse cord, 2-twist lagave		50. number of flakes without platforms per square	
54. number of flakes without platforms per square		53. thin flake side scraper, one edge utilized		46. 2-ply coarse cord, 2-twist lagave		51. number of flakes without platforms per square	
55. number of flakes without platforms per square		54. thin flake side scraper, one edge utilized		47. 2-ply coarse cord, 2-twist lagave		52. number of flakes without platforms per square	
56. number of flakes without platforms per square		55. thin flake side scraper, one edge utilized		48. 2-ply coarse cord, 2-twist lagave		53. number of flakes without platforms per square	
57. number of flakes without platforms per square		56. thin flake side scraper, one edge utilized		49. 2-ply coarse cord, 2-twist lagave		54. number of flakes without platforms per square	
58. number of flakes without platforms per square		57. thin flake side scraper, one edge utilized		50. 2-ply coarse cord, 2-twist lagave		55. number of flakes without platforms per square	
59. number of flakes without platforms per square		58. thin flake side scraper, one edge utilized		51. 2-ply coarse cord, 2-twist lagave		56. number of flakes without platforms per square	
60. number of flakes without platforms per square		59. thin flake side scraper, one edge utilized		52. 2-ply coarse cord, 2-twist lagave		57. number of flakes without platforms per square	
61. number of flakes without platforms per square		60. thin flake side scraper, one edge utilized		53. 2-ply coarse cord, 2-twist lagave		58. number of flakes without platforms per square	
62. number of flakes without platforms per square		61. thin flake side scraper, one edge utilized		54. 2-ply coarse cord, 2-twist lagave		59. number of flakes without platforms per square	
63. number of flakes without platforms per square		62. thin flake side scraper, one edge utilized		55. 2-ply coarse cord, 2-twist lagave		60. number of flakes without platforms per square	
64. number of flakes without platforms per square		63. thin flake side scraper, one edge utilized		56. 2-ply coarse cord, 2-twist lagave		61. number of flakes without platforms per square	
65. number of flakes without platforms per square		64. thin flake side scraper, one edge utilized		57. 2-ply coarse cord, 2-twist lagave		62. number of flakes without platforms per square	
66. number of flakes without platforms per square		65. thin flake side scraper, one edge utilized		58. 2-ply coarse cord, 2-twist lagave		63. number of flakes without platforms per square	
67. number of flakes without platforms per square		66. thin flake side scraper, one edge utilized		59. 2-ply coarse cord, 2-twist lagave		64. number of flakes without platforms per square	
68. number of flakes without platforms per square		67. thin flake side scraper, one edge utilized		60. 2-ply coarse cord, 2-twist lagave		65. number of flakes without platforms per square	
69. number of flakes without platforms per square		68. thin flake side scraper, one edge utilized		61. 2-ply coarse cord, 2-twist lagave		66. number of flakes without platforms per square	
70. number of flakes without platforms per square		69. thin flake side scraper, one edge utilized		62. 2-ply coarse cord, 2-twist lagave		67. number of flakes without platforms per square	
71. number of flakes without platforms per square		70. thin flake side scraper, one edge utilized		63. 2-ply coarse cord, 2-twist lagave		68. number of flakes without platforms per square	
72. number of flakes without platforms per square		71. thin flake side scraper, one edge utilized		64. 2-ply coarse cord, 2-twist lagave		69. number of flakes without platforms per square	
73. number of flakes without platforms per square		72. thin flake side scraper, one edge utilized		65. 2-ply coarse cord, 2-twist lagave		70. number of flakes without platforms per square	
74. number of flakes without platforms per square		73. thin flake side scraper, one edge utilized		66. 2-ply coarse cord, 2-twist lagave		71. number of flakes without platforms per square	
75. number of flakes without platforms per square		74. thin flake side scraper, one edge utilized		67. 2-ply coarse cord, 2-twist lagave		72. number of flakes without platforms per square	
76. number of flakes without platforms per square		75. thin flake side scraper, one edge utilized		68. 2-ply coarse cord, 2-twist lagave		73. number of flakes without platforms per square	
77. number of flakes without platforms per square		76. thin flake side scraper, one edge utilized		69. 2-ply coarse cord, 2-twist lagave		74. number of flakes without platforms per square	
78. number of flakes without platforms per square		77. thin flake side scraper, one edge utilized		70. 2-ply coarse cord, 2-twist lagave		75. number of flakes without platforms per square	
79. number of flakes without platforms per square		78. thin flake side scraper, one edge utilized		71. 2-ply coarse cord, 2-twist lagave		76. number of flakes without platforms per square	
80. number of flakes without platforms per square		79. thin flake side scraper, one edge utilized		72. 2-ply coarse cord, 2-twist lagave		77. number of flakes without platforms per square	
81. number of flakes without platforms per square		80. thin flake side scraper, one edge utilized		73. 2-ply coarse cord, 2-twist lagave		78. number of flakes without platforms per square	
82. number of flakes without platforms per square		81. thin flake side scraper, one edge utilized		74. 2-ply coarse cord, 2-twist lagave		79. number of flakes without platforms per square	
83. number of flakes without platforms per square		82. thin flake side scraper, one edge utilized		75. 2-ply coarse cord, 2-twist lagave		80. number of flakes without platforms per square	
84. number of flakes without platforms per square		83. thin flake side scraper, one edge utilized		76. 2-ply coarse cord, 2-twist lagave		81. number of flakes without platforms per square	
85. number of flakes without platforms per square		84. thin flake side scraper, one edge utilized		77. 2-ply coarse cord, 2-twist lagave		82. number of flakes without platforms per square	
86. number of flakes without platforms per square		85. thin flake side scraper, one edge utilized		78. 2-ply coarse cord, 2-twist lagave		83. number of flakes without platforms per square	
87. number of flakes without platforms per square		86. thin flake side scraper, one edge utilized		79. 2-ply coarse cord, 2-twist lagave		84. number of flakes without platforms per square	
88. number of flakes without platforms per square		87. thin flake side scraper, one edge utilized		80. 2-ply coarse cord, 2-twist lagave		85. number of flakes without platforms per square	
89. number of flakes without platforms per square		88. thin flake side scraper, one edge utilized		81. 2-ply coarse cord, 2-twist lagave		86. number of flakes without platforms per square	
90. number of flakes without platforms per square		89. thin flake side scraper, one edge utilized		82. 2-ply coarse cord, 2-twist lagave		87. number of flakes without platforms per square	
91. number of flakes without platforms per square		90. thin flake side scraper, one edge utilized		83. 2-ply coarse cord, 2-twist lagave		88. number of flakes without platforms per square	
92. number of flakes without platforms per square		91. thin flake side scraper, one edge utilized		84. 2-ply coarse cord, 2-twist lagave		89. number of flakes without platforms per square	
93. number of flakes without platforms per square		92. thin flake side scraper, one edge utilized		85. 2-ply coarse cord, 2-twist lagave		90. number of flakes without platforms per square	
94. number of flakes without platforms per square		93. thin flake side scraper, one edge utilized		86. 2-ply coarse cord, 2-twist lagave		91. number of flakes without platforms per square	
95. number of flakes without platforms per square		94. thin flake side scraper, one edge utilized		87. 2-ply coarse cord, 2-twist lagave		92. number of flakes without platforms per square	
96. number of flakes without platforms per square		95. thin flake side scraper, one edge utilized		88. 2-ply coarse cord, 2-twist lagave		93. number of flakes without platforms per square	
97. number of flakes without platforms per square		96. thin flake side scraper, one edge utilized		89. 2-ply coarse cord, 2-twist lagave		94. number of flakes without platforms per square	
98. number of flakes without platforms per square		97. thin flake side scraper, one edge utilized		90. 2-ply coarse cord, 2-twist lagave		95. number of flakes without platforms per square	
99. number of flakes without platforms per square		98. thin flake side scraper, one edge utilized		91. 2-ply coarse cord, 2-twist lagave		96. number of flakes without platforms per square	
100. number of flakes without platforms per square		99. thin flake side scraper, one edge utilized		92. 2-ply coarse cord, 2-twist lagave		97. number of flakes without platforms per square	
101. number of flakes without platforms per square		100. thin flake side scraper, one edge utilized		93. 2-ply coarse cord, 2-twist lagave		98. number of flakes without platforms per square	
102. number of flakes without platforms per square		101. thin flake side scraper, one edge utilized		94. 2-ply coarse cord, 2-twist lagave		99. number of flakes without platforms per square	
103. number of flakes without platforms per square		102. thin flake side scraper, one edge utilized		95. 2-ply coarse cord, 2-twist lagave		100. number of flakes without platforms per square	
104. number of flakes without platforms per square		103. thin flake side scraper, one edge utilized		96. 2-ply coarse cord, 2-twist lagave		101. number of flakes without platforms per square	
105. number of flakes without platforms per square		104. thin flake side scraper, one edge utilized		97. 2-ply coarse cord, 2-twist lagave		102. number of flakes without platforms per square	
106. number of flakes without platforms per square		105. thin flake side scraper, one edge utilized		98. 2-ply coarse cord, 2-twist lagave		103. number of flakes without platforms per square	
107. number of flakes without platforms per square		106. thin flake side scraper, one edge utilized		99. 2-ply coarse cord, 2-twist lagave		104. number of flakes without platforms per square	
108. number of flakes without platforms per square		107. thin flake side scraper, one edge utilized		100. 2-ply coarse cord, 2-twist lagave		105. number of flakes without platforms per square	
109. number of flakes without platforms per square		108. thin flake side scraper, one edge utilized		101. 2-ply coarse cord, 2-twist lagave		106. number of flakes without platforms per square	
110. number of flakes without platforms per square		109. thin flake side scraper, one edge utilized		102. 2-ply coarse cord, 2-twist lagave		107. number of flakes without platforms per square	
111. number of flakes without platforms per square		110. thin flake side scraper, one edge utilized		103. 2-ply coarse cord, 2-twist lagave		108. number of flakes without platforms per square	
112. number of flakes without platforms per square		111. thin flake side scraper, one edge utilized		104. 2-ply coarse cord, 2-twist lagave		109. number of flakes without platforms per square	
113. number of flakes without platforms per square		112. thin flake side scraper, one edge utilized		105. 2-ply coarse cord, 2-twist lagave		110. number of flakes without platforms per square	
114. number of flakes without platforms per square		113. thin flake side scraper, one edge utilized		106. 2-ply coarse cord, 2-twist lagave		111. number of flakes without platforms per square	
115. number of flakes without platforms per square		114. thin flake side scraper, one edge utilized		107. 2-ply coarse cord, 2-twist lagave		112. number of flakes without platforms per square	
116. number of flakes without platforms per square		115. thin flake side scraper, one edge utilized		108. 2-ply coarse cord, 2-twist lagave		113. number of flakes without platforms per square	
117. number of flakes without platforms per square		116. thin flake side scraper, one edge utilized		109. 2-ply coarse cord, 2-twist lagave		114. number of flakes without platforms per square	
118. number of flakes without platforms per square		117. thin flake side scraper, one edge utilized		110. 2-ply coarse cord, 2-twist lagave		115. number of flakes without platforms per square	
119. number of flakes without platforms per square		118. thin flake side scraper, one edge utilized		111. 2-ply coarse cord, 2-twist lagave		116. number of flakes without platforms per square	
120. number of flakes without platforms per square		119. thin flake side scraper, one edge utilized		112. 2-ply coarse cord, 2-twist lagave		117. number of flakes without platforms per square	
121. number of flakes without platforms per square		120. thin flake side scraper, one edge utilized		113. 2-ply coarse cord, 2-twist lagave		118. number of flakes without platforms per square	
122. number of flakes without platforms per square		121. thin flake side scraper, one edge utilized		114. 2-ply coarse cord, 2-twist lagave		119. number of flakes without platforms per square	
123. number of flakes without platforms per square		122. thin flake side scraper, one edge utilized		115. 2-ply coarse cord, 2-twist lagave		120. number of flakes without platforms per square	
124. number of flakes without platforms per square		123. thin flake side scraper, one edge utilized		116. 2-ply coarse cord, 2-twist lagave		121. number of flakes without platforms per square	
125. number of flakes without platforms per square		124. thin flake side scraper, one edge utilized		117. 2-ply coarse cord, 2-twist lagave		122. number of flakes without platforms per square	
126. number of flakes without platforms per square		125. thin flake side scraper, one edge utilized		118. 2-ply coarse cord, 2-twist lagave		123. number of flakes without platforms per square	
127. number of flakes without platforms per square		126. thin flake side scraper, one edge utilized		119. 2-ply coarse cord, 2-twist lagave		124. number of flakes without platforms per square	
128. number of flakes without platforms per square		127. thin flake side scraper, one edge utilized		120. 2-ply coarse cord, 2-twist lagave		125. number of flakes without platforms per square	
129. number of flakes without platforms per square		128. thin flake side scraper, one edge utilized		121. 2-ply coarse cord, 2-twist lagave		126. number of	



The Way of Life of Zone IX

Originally, Floor 16 on Zone IX was probably continuous over the entire eastern portion of the site, extending beyond the limits of our excavation. Subsequently, however, Zone IX was greatly disturbed by the digging activities of occupants of the later Zones VI, VII, and VIII, above it—particularly in the case of feature No. 1, in the area of Squares N1E6 and N1E7. The zone extended from 0 to E15 and from the S2 line to the N4 edge of excavation. There was a gap in the floor between E5 and E16 and the N1 and N2 lines (see Fig. 98). Zone IX was a shallow stratum varying from 5 to 20 cm. in thickness and composed largely of a gray ashy material. Its upper half yielded a substantial quantity of preserved plant remains.

While only one pochote pod of the late winter occurred in Activity Area A, from Areas B and C came plants such as winter *Opuntia* fruits and *Ceiba* pods, wet-season bones, deer fetus, and fish, spring seeds such as *Setaria*, grass, and mesquite, summer crops like corn, squashes, and amaranth, and fall fruits be-

sides, avocado, coyol, chupandilla, cosahuico, and sapotes. Taken altogether, the plant remains thus suggested a late winter occupation that lasted into the following fall. The size of this floor, which probably extended well east and north of our excavation, and the presence of 3 hearths, Features 18, 53, and 77, as well as Charcoal Area 15, suggest Occupation 26 was a macroband, that is, three or more families. According to our estimates based on preserved ecofacts, about 41 percent of their diet came from a wide variety of wild plants, 34 percent came from meat, and 25 percent from domesticates or cultivars such as chili, amaranth, avocado, moschata squash, gourds, corn, black and white sapotes, and chupandilla plums. Two coprolites with pochote, *Agave*, meat, and squash were present. It would seem that it was the surplus storable wild seeds and domesticates such as corn, amaranth, chili, and *Cucurbita* seeds, all found in the many storage or cache pits, that enabled the group to remain here for a period of several consecutive seasons. The macroband may have arrived at the rock shelter in late winter or early spring to collect seeds, pods, and *Opuntia* fruits, and, at the same time, to plant their amaranth, chili, corn, and squash. These reached fruition in the summer, about the time the spring wild foods were gone, and constituted their agricultural produce, the surplus of which could be stored to augment the fruits they picked in the fall.

On the basis of the distributional data, three activity areas were defined (Fig. 120). Activity Area A, in the northeastern corner of Floor 16, extended from E6 to E10 and from N2 to N4, encompassing Fire Pit 53 in Square N3E8. It contained Coxcatlan (2), Abasolo, and Pelona projectile points, choppers, and a thin, ovoid biface, numerous end-scrapers, and 2 grinding stones, along with many side-scraper fragments, chips and cores. The animal bones were largely of Audubon cottontail rabbit, but there was also a deer femur. Activity Area A may have been the location of one family group involved in a variety of activities, such as food preparation, cooking, skin-scraping, flint-knapping, and so on.

Activity Area B stretched from E7 to E15, between, roughly, the 0 east-west line and S3. A fire pit, Feature No. 77, was located at its western edge. Several projectile points, including Coxcatlan, Tilapa, Garyito, and Pelona types, occurred in Area B's western half. The area also contained deer bones and Audubon cottontail and fox remains, suggesting both hunting and trapping. There were many plant remains comprising fall fruits, spring seeds, and domesticates—corn, avocado, gourd, amaranth, chili, and white sapote. Among the side-

scrapers numbered 3 spokeshaves, which were found in the vicinity of wooden implements, suggesting some woodworking took place here. The heaviest concentration of artifacts and chips was in Square S3E9: it included a number of end-scrapers, bifaces, a chopper, blade, and scraper-plane, a piece of string, mano fragments, and side-scrapers. Square S3E10 contained many obsidian flakes, suggesting the direct procurement exchange system still was in operation. Activity Area B appeared as a second family group's camping spot and center of activities, similar to those of Area A, with the addition of woodworking and string-making.

Activity Area C included the cache pits and storage pits Nos. 13, 14, 23, 31, 44, and 71, as well as Fire Pit 18 and Charcoal Area 15. It extended fully from E7 over to the 0 north-south line and from S2 to north of the N3 line. Most of the deer remains, 1 cottontail rabbit bone, and a large concentration of chips and projectile points spread over the area between E2 and E7, mainly in the squares south of the 0 east-west line. The points included 36 Coxcatlan types, 4 Almagre, 1 Tlapala, 1 Garyito, 1 Trinidad, and 1 Abejas point. With the many chips and cores were found 8 choppers, possible quarry blanks, along with the 2 Nogales and the 4 Abasolo points that could have been preforms. Area C contained the bulk of the grinding stones found on this living floor, and the only preserved moschata squash seed. Spokeshaves associated with wooden tools, and yarn, string, knots, and a bone awl, indicated woodworking, and string-making, weaving, and the tailoring of skins, respectively. This area also contained the few complete side-scrapers found in Zone IX. Area C appeared similar, in terms of activities, to Areas A and B and perhaps represented the third microband element of the macroband occupation.

The artifacts from this zone were typically Abejas; and three Carbon-14 dates from Activity Area C averaged 3183 ± 112 B.C. (I-766, I-594, I-652) (*Radiocarbon* 11:90, 92).

The Way of Life of Zone VIII

The last of the Abejas occupation floors, Floor 17 on Zone VIII, covered mainly the eastern portion of the site, south of the N4 line, from E15 to just west of the 0 north-south axis. It was a gray ash layer capped by a thin, organic, dark brown floor. This organic floor appeared only in traces, however, in the western portion of the zone; but, again, it may also have extended further east and north of our trench limits. A relatively large area of the occupation floor was disturbed by a later feature to the extent that it could not be utilized in the analysis of this zone.

There was considerable evidence that 3 of the 4 identifiable activity areas were roughly contemporaneous: for Areas B, C, and D contained fall, winter, and spring plants; Area B had cosahuico, chupandilla of the fall, *Opuntia* flower of the winter, and *Setaria*, *Agave*, and amaranth of the spring; Area C had avocado, chupandilla, and sapote of the fall, hardened deer antler, pochote, and *Opuntia* flower of the winter, and grass, *Setaria*, and mesquite of the spring; while Area D had ciruela of the fall, pochote and *Opuntia* of the winter, and mesquite, grass, and *Setaria* seeds of the spring. Areas C and D also included chili and corn, while Area B had amaranth and squash seeds that grow in the summer. These all were storable, and probably were surpluses from an earlier season, which they brought with them to the cave, for none of the typical summer indicators, such as reptile, or deer fetus, were found on the floor. Area A, in contrast, contained no floral or faunal remains, and possibly represents a separate occupation; it had many flint chips, and Garyito, Coxcatlan, Pelona, and Abasolo points, but no bones, unlike the other areas. It could represent a brief, winter stop by hunters to resharpen their tools; then again, it could be merely a specialized part of the longer and larger occupation.

Be that as it may, let us first consider the fall through spring occupation of a relatively large group of people, which took place here, and from which in Areas B, C, and D, we have recovered remains of their food-stuffs. From the bone and vegetal remains together, we have estimated that 26 percent of their diet came from meat, about 54 percent from wild plants, and 20 percent from cultivars: chili, amaranth, avocado, mixta squash, moschata squash, gourd, corn, black and white sapote, common beans, tepary beans, and chupandilla (with very large pits). Two coprolites were found containing mainly meat; one had maguey in it, and the other, some corn. On the basis of both seasonal indicators furnished by plant remains and the seasonality factor itself, we have estimated that the group was living, in part, off surpluses grown elsewhere the previous summer, perhaps near their other, more permanent, homes.

Now let us discuss the activities of this definite single occupation. Activity Area B centered around the very large Fire Pit 42, which appeared as a prototype of the large maguey roasting pits of later times. The area was characterized by the very few deer remains. Those animals represented were mainly small mammals that could have been trapped. The other distinguishing characteristic was its collection of projectile points which, except for 1 Coxcatlan point, was one of bulky

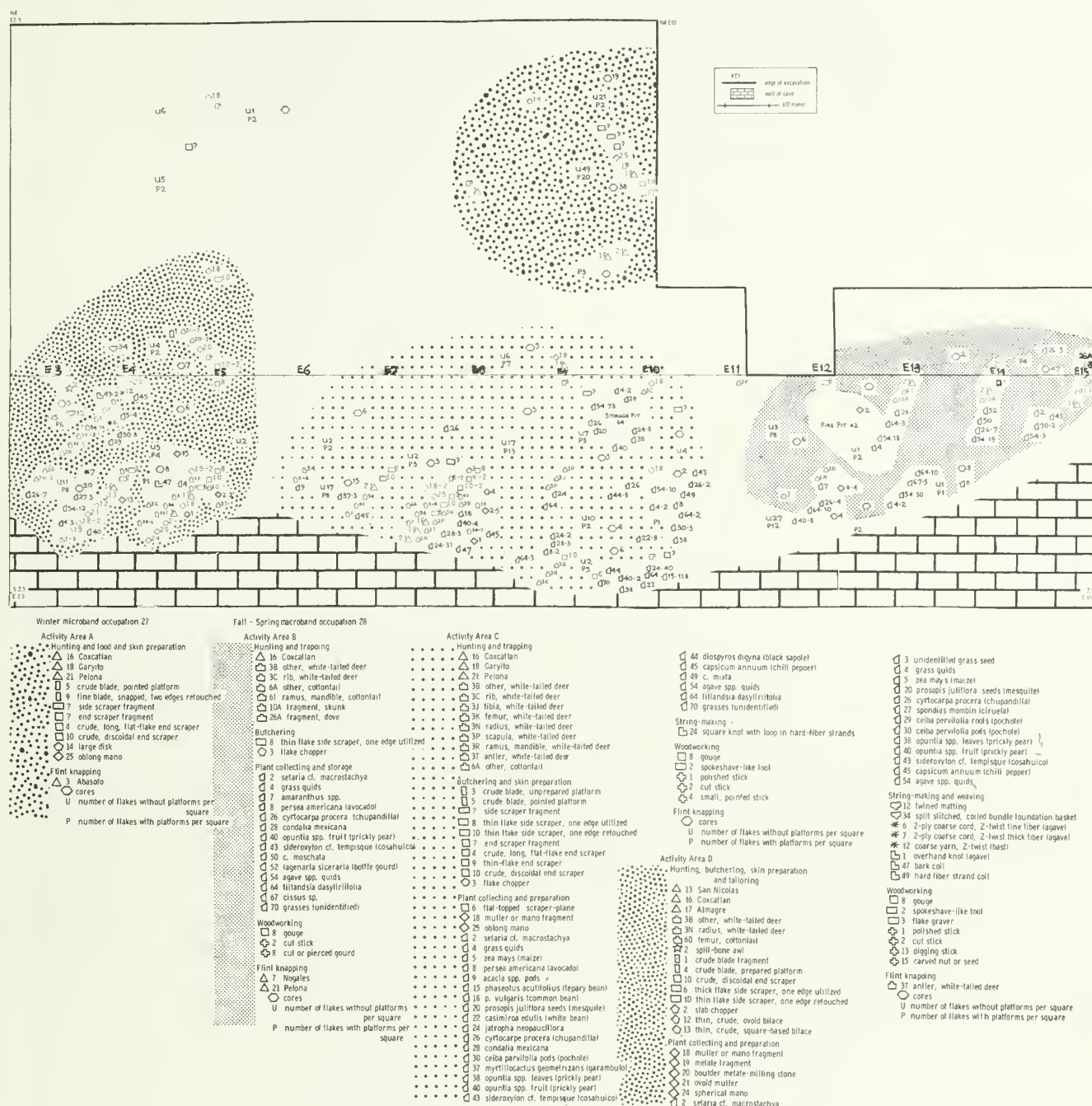


Fig. 121. Activity areas of Zone VIII of Tc 50.

types, including a Nogales and 2 Pelona points. Both kinds could have been preforms, for they were found in association with many cores and flakes. A large number of plant remains also were present, but no grinding stones, suggesting plant collecting, cooking, and storage, rather than seed preparation. A chopper and a side-scraper also were in this region, indicating that some meat was processed before being cooked here. A

gouge, a worked stick, and cut pieces of gourds suggested woodworking activity, as well.

Activity Area C spread southwestward from the storage pit, with its many plant remains, covering the area between E6 and E11, south of the 0 east-west axis. The area was characterized by the major concentration of deer bones from the floor, both end- and side-scrapers, blades, and a chopper. They suggested

both butchering and skin-working. A number of projectile points found here included 2 Pelona points, a Coxcatlan, and 2 Garyito types. Some grinding stones and a scraper-plane also came from this activity area, along with the plant remains which included domesticated plants, such as the chili and maize, as well as the seeds, leaves, and stems of wild plants. A knot, the product of string-making, and a gouge and spokeshave with three pieces of worked wood, the signs of wood-working, occurred. This whole area seems to have been one of general activity; hunting was the major endeavor, but plant processing, and other activities, were evidenced as well, very much like Area B.

The third activity area belonging to this occupation, Area D, was located to the southwest of the area disturbed by feature No. 1, concentrated largely between E3 and E5 and from N1 to the S2 line. Animal bones recovered here were primarily those of deer. Only 3 projectile points—a Coxcatlan, an Almagre, and a San Nicolas—were found. There were preserved plant remains including maize and chili, and fragments of wild plant foods. This area was distinctive for the presence of metates and mullers and a spherical mano. Then this was certainly an activity area where plant food processing was carried out. Many cores, flakes, and an antler tine evidenced flint-knapping; and alongside of it, woodworking was probably practiced, as the gouges, spokeshave, graver, and many wooden tools testified. Besides these artifacts, there were end-scrapers, a bone awl, side-scrapers, a couple of blades, and bifaces, as well as an overhand knot of *Agave* Z-twisted yarn, a square knot of *Agave* fibers, bark fiber, 2 coils of *Agave* fibers, a coiled bundle foundation basket, and a piece of twined matting. Again a wide variety of activities seems to have been carried on here.

The fourth activity area, A, that may or may not have been connected with the others, was concentrated northward and eastward of the area disturbed by Feature 1, roughly between E8 and E10 between N1 and N4. There were no animal remains, and the activity area was largely defined by the concentration of Garyito, Abasolo, Coxcatlan, and Pelona projectile points, 2 blades, a biface, a mano fragment, 2 end-scrapers, and side-scraper fragments, and many chips and cores.

As in the earlier Abejas zones, it seems entirely possible that in Zone VIII, 3, if not all 4 activity areas represented the foci of the encampment of three or four families in the rock shelter who performed the complete range of necessary tasks during their long stay at, or else, intermittent visits to the cave over the course of three seasons. It was slightly different from the other Abejas occupations in that they were less ex-

pert flint-knappers, but the pattern was the same for again this Abejas occupation was larger and more permanent with more domesticated plants in their diet than those from the occupations of the previous phases.

This is the final Preceramic occupation of Coxcatlan Cave and the artifacts are of Abejas type. Two Carbon-14 dates from Areas B and C give an average date of 3010 ± 140 B.C. (I-593, I-563) (*Radiocarbon* 11:90).

The Way of Life of Zone VII

Although it was not readily apparent in the stratigraphy, the cultural materials and radiocarbon determinations indicated that there was a long gap in time (2500 years) between Zones VIII and VII. The slight disconformity between the underlying strata of Series B and overlying Series A (beginning with Zone VII), suggests that, when the shelter was reoccupied following a long period of no occupation, the people of Zone VII, by cleaning and leveling off earlier strata, may have removed part of the top of Zone VIII in the east and may also have cleaned down to Zone XI in the west, taking off all or any strata between Zone VII and Zone XI.

There was, besides this stratigraphic discontinuity, a marked cultural change. Between 2500 B.C. and 200 B.C., major cultural developments took place in the Tehuacan Valley and, starting with Zone VII, the occupations, being of quite a different nature, reflect the beginning of a whole new way of life.

Aside from the disturbance of Feature 1 (E5 to E8 between S1 and N2) intrusive from Zone VI and Feature 40 (E7 to E10 between N1 and S1) from Zone III, Zone VII extended over the entire area of the excavated floor of the rock shelter (see Fig. 98). The zone was full of vegetal materials, and, although it contained much ash and yellow soil, the soil was largely of a dark gray color. Within the zone, two charcoal and vegetal floors were recognized. The lower Floor 18 appeared between W4 and W2 near the area of the rockfall with perhaps a trace of it in the vicinity of E10. Above Floor 18 in the area around the western rockfall was another living floor, labeled Floor 19. In many areas of the cave neither floor was discernible, and so artifacts and ecofacts could not definitely be assigned to one or the other.

Later horizontal plotting of the artifacts and ecofacts indicated that there were at least three well-defined activity areas and that at least two of these may not have been contemporaneous (Fig. 122). Activity Area A to the east had wet-season racerunner lizards, but mainly plants from the fall. Area B from the middle of the cave had a whole series of spring plants, as

well as tetecho and *Opuntia* fruits and pochote roots of the winter, but few non-storable plants that could be tied to the wet summer or fall season. Area C to the west had spring to fall plant and animal remains, but few winter ones. While the floors may indicate two occupations, the seasonal indicators suggest there were really three.

Activity Area A extended roughly from E4 to E15 between the S3 and N3 axes. In the region of Area A the layer was fairly thick and, as mentioned previously, in the general area between S1 and S3 from E8 to E10 there was an early floor in it (Floor 18). The racerunner bones, as well as the fall avocado, chupandilla, ciruela, and guava remains, suggested a late summer-fall occupation (Occupation 29). This occupation associated with Floor 18 seemed to be centered around Feature 57, a storage pit. There was a fair concentration of bones, including parts of 2 or 3 deer, a mouse, and a racerunner lizard, associated with a few end-scrapers and plants in a refuse area at S1E14, Feature 68; also string, knots, side-scrapers, and metate and milling stones. There were a few points right around Feature 57 and the fire pit, Feature 55, but whether they were in the pits or not is difficult to say. Be that as it may, it would seem that the area represented a small task-force visit in the summer and/or fall, possibly by only a few individuals who probably came to harvest fruits and/or corn and to hunt and butcher their kill (2 deer).

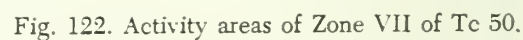
Although the evidence was far from clear, the rest of Area A seemed to represent a later occupation of Floor 19, and to be of a different nature. The plant and animal remains suggested a summer to winter occupation. Seemingly associated with this later occupation was Feature 55, a fire pit about a meter wide and a meter and a half long, roughly in Square E10. Also in S1E8 was a storage pit, Feature 52. Within this larger area were 4 more deer, 2 rabbits, and killdeer bird, plus Pelona, San Nicolas, Coxcatlan, and Catan points. Apparently, these people hunted and butchered their meat in this area. Further, the many plant remains including corn, guava, squash, and several wild plants, in association with mano, metates, and milling stones, suggested they were preparing the meat and the domesticated plants they had harvested. String, a blade, side- and end-scrapers further suggested a number of other activities. Here we have a home-base sort of encampment where a group came for a few seasons, leaving their permanent homes in the hamlets or villages nearby.

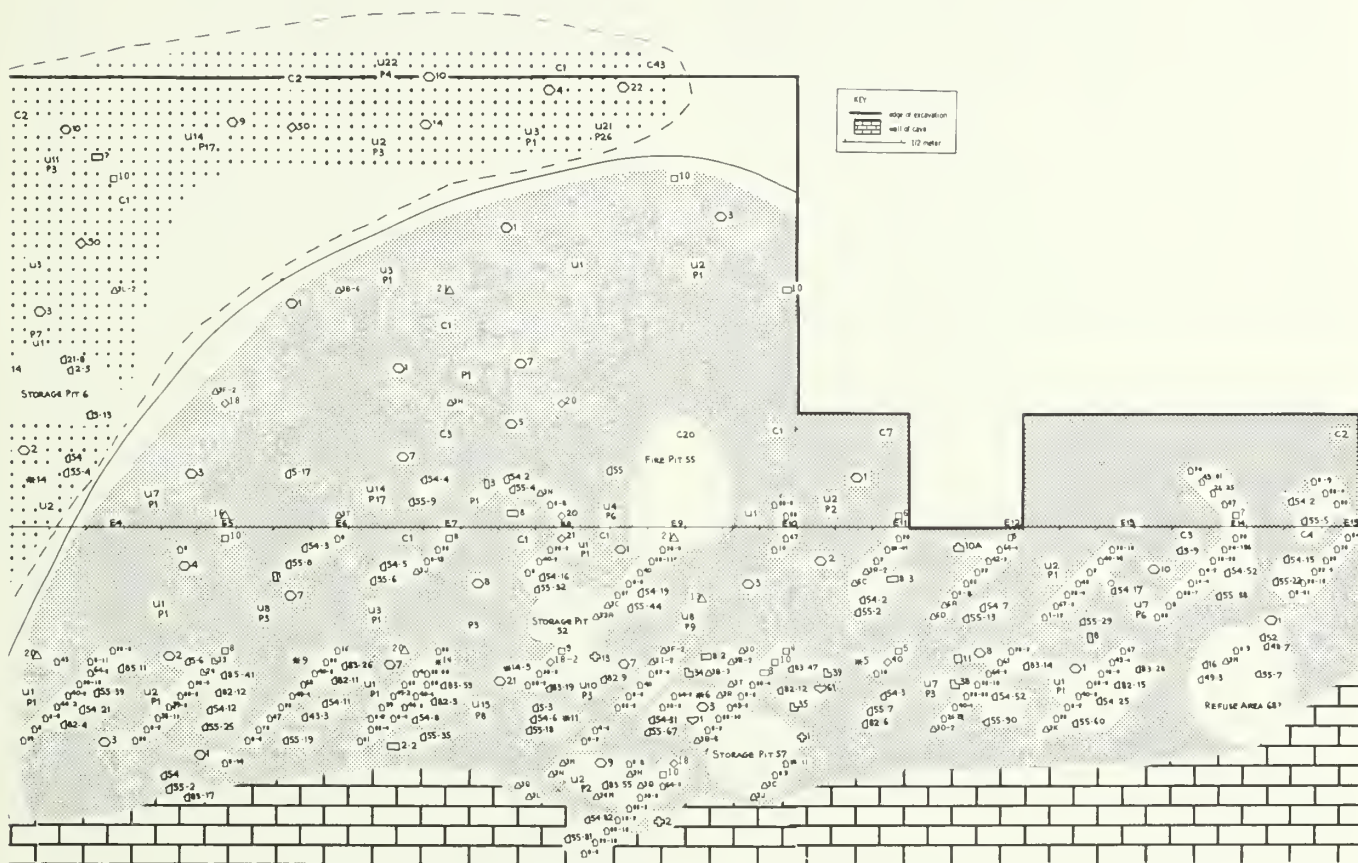
Another obvious concentration of artifacts appeared in the area between 0 and W1 and S1 and S3, south of

Feature 7, another fire pit. These included projectiles, bifaces, manos, metates, and some scrapers. Probably the larger activity area, Area B, centered around Feature 7 and perhaps extended from W1 to E4 and, with a possible small tongue to E9 along the N4 profile, included the cache pit, Feature 8, and the storage pit, Feature 6. While there were no bones in this area there were many plant remains, both wild and domesticated, and they seemed to be of maybe the winter and spring seasons. Certainly plants were therefore being processed here and one cannot help wondering if the area represents a planting camp, either by a few individuals or by a family. Whether Area B was connected with the occupation of Floor 18 or that of Floor 19 or was yet another occupation could not definitely be determined because of the extensive pitting of the area. We shall, however, consider it to be a third occupation, Occupation 30.

Activity Area C was in the western portion of the zone from W1 to W9. As mentioned before, both Floors 18 and 19 occurred in this area and it was difficult to assign many of the artifacts and ecofacts to either one of them. However, what few items could be assigned to one or the other suggest the activities of both floors were much the same and, furthermore, the plant and animal remains suggest a spring to fall or spring and fall occupation (Occupation 31), perhaps of the later Floor 19. This area included some concentration of animal bones, a deer, peccary, 3 cottontails, a black iguana, and racerunner lizard, but no projectile points. Perhaps these people were trappers rather than hunters, but whatever they were they were processing their meat in this area. The presence of fire pits, Features 2, 70, and 58 suggested that meat as well as plant food was cooked in Area C. Further, sherds of everted-rim, flaring-rim, outsloping-rim, and incurved-rim bowls of Quachilco Gray, as well as a bowl of El Riego Gray and one of Coatepec White-rimmed Black, had carbon adhering to their interiors, suggesting they were the receptacles in which the food was cooked. Abundant plant remains, however, suggested these were the major items of their diet, and mano and metates and a very few scrapers suggested that an important activity was plant food processing. In fact, the tremendous concentrations of maize in this area (Storage Pit 47 was full of maize) may indicate that one of the major purposes of the occupations in Area C was to harvest maize, either by a family or a small group of individuals. The lack of kernels with cut glumes suggests these people were shucking the corn so that it could be transported elsewhere.

What then can we suggest for the activities of this





Summer-fall microband occupation 29 - Floors 18 and 19

Plant collecting, harvesting, and preparation

- 18 mullet or mano fragment
- 20 boulder metate-milling stone
- 23 ovoid mano
- 14 cotton yarn, 2-twist
- 17 slip knot, in root or bark strands
- 33 square knot, without loop, in hard fiber strands
- 2 setaria cf. macrostachya
- 4 grass quids
- 5 zea mays limaizel
- 9 acacia spp. pods
- 14 leucaena esculenta
- 20 prosopis juliflora seeds (mesquite)
- 21 prosopis juliflora quids (mesquite)
- 28 jatrophia neoauctiflora
- 26 condalia mexicana
- 29 ceiba parvifolia pods (pochote)
- 30 ceiba parvifolia pods (pochote)
- 31 cephalocereus hopenstedtii (teteche)
- 36 1. weberi fruit (cardon)
- 38 opuntia spp. leaves (prickly pear)
- 39 opuntia spp. seeds (prickly pear)
- 43 sideroxylon cf. lempique (cosahuico)
- 48 unidentified cucurbita spp. squashes and pumpkins
- 54 agave spp. quids
- 55 agave spp. leaves
- 61 hechtia sp.
- 62 bark
- 63 wood
- C number of sherds per square

Activity Area A

Hunting and butchering

- 3 crude blade, unprepared platform
- 3 crude blade, pointed platform
- 3 fine blade, pointed platform
- 3 spokeshave-like tool
- 3 flake graver
- 10 thin flake side scraper, one edge utilized
- 10 thin flake side scraper, one edge retouched
- 3 crude, long, flat-flake end scraper
- 3 domed scraper-plane
- 3 flat-topped scraper-plane
- 3 multi-angled scraper-plane
- 3 gouge
- 3 thin-flake end scraper
- 10 crude, discoidal end scraper
- 11 end-of-blade end scraper
- 13 San Nicolas
- 16 Coccattian
- 20 Callan
- 21 Pelona
- 11 thin fragment
- 36 other, white-tailed deer

- 3C rib, white-tailed deer
- 3E phalanx, white-tailed deer
- 3F metapodial, white-tailed deer
- 3H astragalus, white-tailed deer
- 3I calcaneum, white-tailed deer
- 3J ilium, white-tailed deer
- 3K femur, white-tailed deer
- 3L innominate, white-tailed deer
- 3M ulna, white-tailed deer
- 3N radius, white-tailed deer
- 3O humerus, white-tailed deer
- 3P petrous bone, white-tailed deer
- 3R ramus, mandible, white-tailed deer
- 3S other, cotton-tail
- 3T ilium, cotton-tail
- 3U femur
- 3V scapula
- 3W other lizards

Plant collecting, harvesting and preparation

- 18 mullet or mano fragment
- 20 boulder metate-milling stone
- 23 ovoid mano
- 14 cotton yarn, 2-twist
- 17 slip knot, in root or bark strands
- 33 square knot, without loop, in hard fiber strands
- 2 setaria cf. macrostachya
- 4 grass quids
- 5 zea mays limaizel
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- 20 prosopis juliflora seeds (mesquite)
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- 48 unidentified cucurbita spp. squashes and pumpkins
- 54 agave spp. quids
- 55 agave spp. leaves
- 61 hechtia sp.
- 62 bark
- 63 wood
- C number of sherds per square

- 9 acacia spp. pods
- 14 leucaena esculenta
- 19 p. cocci neus (runner bean)
- 20 prosopis juliflora pods (mesquite)
- 21 prosopis juliflora seeds (mesquite)
- 22 casimiroa edulis (white bean)
- 23 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (citrifolia)
- 29 ceiba parvifolia roots (pochote)
- 30 ceiba parvifolia pods (pochote)
- 38 opuntia spp. leaves (prickly pear)
- 39 opuntia spp. seeds (prickly pear)
- 40 opuntia spp. fruit (prickly pear)
- 42 burmelia laefevrens
- 43 sideroxylon cf. lempique
- 44 disopyros origina (black sapote)
- 45 capsicum annuum (chili pepper)
- 48 unidentified cucurbita spp. squashes and pumpkins
- 49 c. mista
- 52 lageneria sicaria (bottle gourd)
- 54 agave spp. quids
- 55 agave spp. leaves
- 56 tilandesia dasyphylla
- 67 cissus sp.
- 68 gossypium hirsutum (cotton)
- 69 bark
- 70 wood
- C number of sherds per square

zone? We would suggest first that we have three occupations, as indicated by the distribution of seasonal plant and animal remains, associated with two superimposed floors, scattered along the 0 east-west line. While some of the food-processing and consuming was done here, and people slept here during planting and harvesting times, plant foods grown and harvested near the cave were probably, for the most part, carried to the more permanent living sites in the Tehuacan Valley for consumption. Thus, Zone VII was a temporary harvest and planting encampment. This may be suggested also by Callen's analysis of the human coprolites from this zone, which indicated that the principal plant remains observable in these coprolites were of *Setaria*, which is a wild grass, a pochote root, maguey fibers, and other cactus tissue. There were some remains of sapote fruit, mesquite pods, and a starchy tissue which may represent *cassava* (see Vol. 1 of this series, pp. 272-274). But, while corn cobs were prominent on the floor, corn kernels in the feces were totally lacking. Callen's data then tends to confirm our idea that people living here were storing some food material (maize and domesticated fruits) but mainly transporting it to other areas rather than utilizing it on the spot.

No radiocarbon dates were determined directly from Zone VII, although Zone VI, immediately above it, has a range suggesting an age of around 180 A.D. However, the pottery indicates that these occupations (29, 30, 31) were of Late Santa Maria times, perhaps between 300 and 100 B.C.

The Way of Life of Zone VI

Zone VI extended over the entire area of the rock shelter excavated (Fig. 123). In the western third of the zone, between W5 and W9 and from N1 northward to N5, was a large rockfall which, of course, covered a large part of the area that would have been occupied by these people. This large rock fell from the bluff above sometime during the latter half of the Santa Maria occupation of the Coxcatlan Rock Shelter. Behind the rockfall, between W3 and W7, there was a concentration of Zone VI materials. Due to the protection of the rock, the area behind it was drier than elsewhere, and several habitation floors (Floors 20-23) were visible as layers of preserved plant remains. These multiple floors were not visible in other areas of Zone VI except for a slight trace between E9 and E11, where the topmost floor of this series is preserved, and another small area between E1 and E2.

Of the several pits in Zone VI, some can be attributed to these various floors but others cannot. In the

small area of preserved floors found between W2 and E2, all of the floors, 20, 21, 22, and 23, were visible, and it was possible to directly attribute six pits in this area as being intrusive from these floors. Except for the plant preservation of the floors described, the remainder of the zone was a black color due to large concentrations of charcoal in the making of the deposition (see Fig. 98). Much of this remaining area of the floor was also disturbed by various pits. Fortunately, the majority of the artifacts and ecofacts came either from the pits or from the well-defined floors to the west, so they could be assigned to their sequential floor position; however, there were some whose only assignment could be to the all-inclusive Zone VI. Adding to the complexity of the occupation of Zone VI, is the fact that the horizontal distribution of the artifacts shows three clusters of artifacts, Activity Areas A, B, and C, and all of these have ecofacts from the spring to the fall. Further, each of these areas in turn may have had as many as four occupations within them, but there is no way in which a particular floor of one area can be definitely connected stratigraphically with any floor of the next area, and, in fact, the number of occupations of this zone may range from a minimum of four to a possible maximum of twelve. However, on the basis of their relative stratigraphic position and the ceramic similarities, we have assumed that the earliest pits and first stratigraphic layer of each of the four activity areas are of the same occupation, Floor 20, that the following group of pits of each belong to Floor 21, the next pits to Floor 22, and the latest pits to Floor 23; we shall present our analysis on this basis.

Activity Area A had a small portion of occupation Floor 20 in it. Although there was no associated feature, some of the corn, grass seed, maguey and pochote plant remains, as well as milling stones, muller, scraper-planes, blades, animal bones, knot and string might pertain to this earliest Occupation No. 32, which could have been one of a microband, for the ecofacts are of the spring and summer seasons. This small patch on Floor 20 we have called Activity Area A1, and its materials contrast with the artifacts and ecofacts of the rest of Activity Area A, which could pertain to any one of Floors 21 to 23, or any combination of Occupations 34-36. Plant remains throughout the other floors in Area A seemed to be of the spring through the fall, and the artifacts and ecofacts were apparently connected with two general activities; one concerned with animal remains and activities connected with them such as hunting, trapping, and butchering (the points, blades, deer, iguana and bird bones), and the other

connected with floral remains (including a metate fragment, a two half-hitch knot and string—possible parts of carrying loops—and a host of domesticated and wild plant remains). Chips and cores may indicate some flint-knapping. It was, however, only in Area B, roughly from S2E2 to N2E8, that materials found in some lower level pits could be assigned to this earliest Floor No. 20 with any degree of confidence, and these, as well as similar pits and floors of Area C, seemed to be of a separate fall occupation (Occupation 33) in contrast to that of Zone A1, also, of Floor 20, but with summer-spring plants. Features assigned to this occupation were Pits 10, 17, 20, and 49 in Area B and Pits 22, 59, 61, and 66 in Area C. From the artifacts and ecofacts found in them we may have gained some insight into the sorts of activities carried out at the time of Occupation 33.

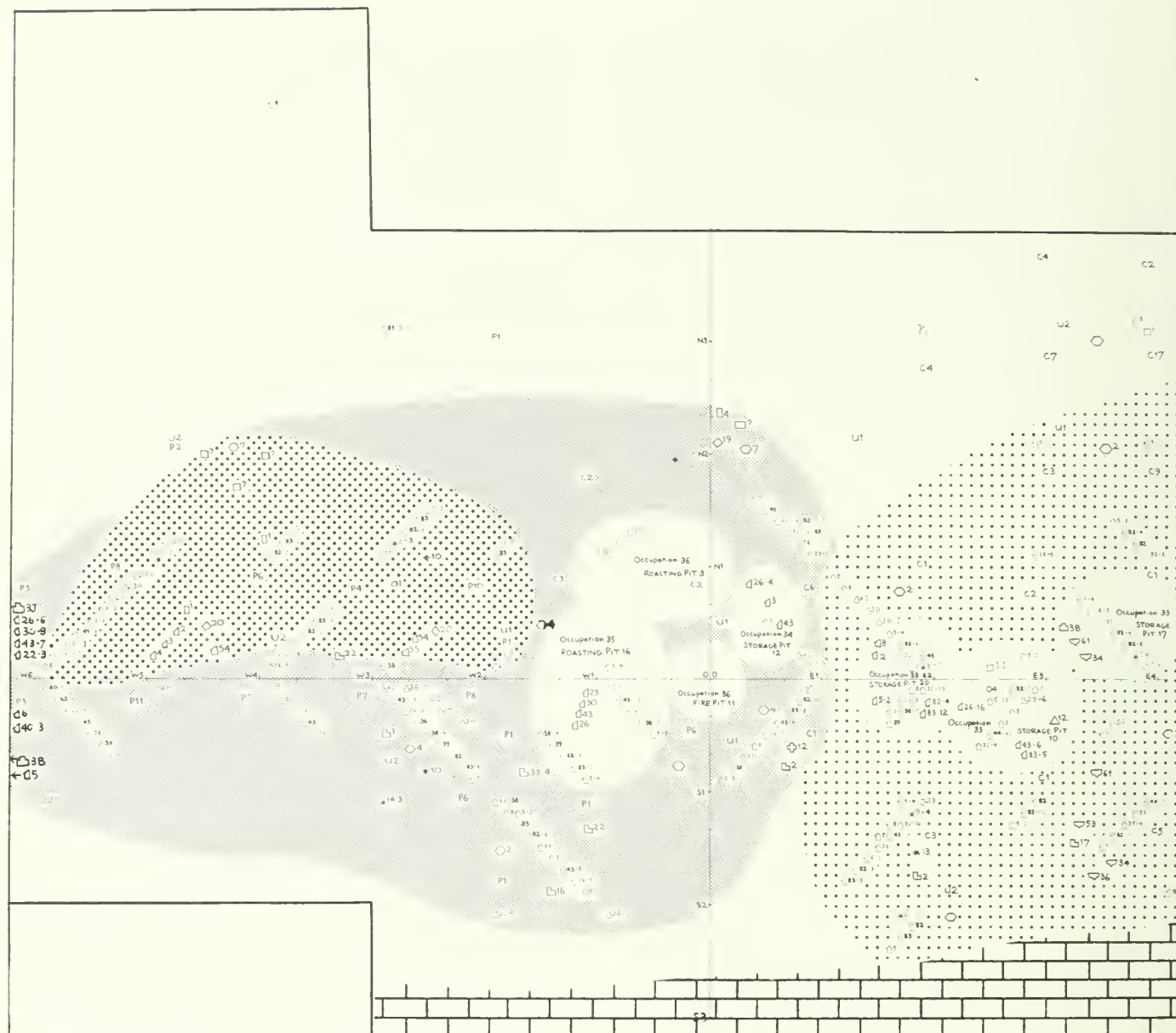
The first feature of this occupation encountered was along the 0 line between E2 and E3 in Area B, Feature 10. This pit was about a meter in length and 60 centimeters in width and extended to a depth of 50 centimeters below its point of intrusion which appeared to be at the lowest portion of Zone VI, that is, Floor 20. There was no indication of burning and it has been classified as a storage pit. Within this pit were found an Agate Basin projectile point, a flake chopper, knots, an end-scraper, some unidentified animal bone fragments, and many plant remains including maize, *Ceiba parvifolia*, grass and *Setaria* seed, chupandilla, black sapote, and cosahuico pits. Storage Pit No. 17, nearby in Square E4, contained a similar plant complex, with the addition of fragments of a sandal, a basket, and string. Feature 20 overlaps Feature 10, another storage pit with a similar complex of foodstuffs. All looked to be pits for storage of agricultural produce harvested in the fall by the occupants of Area B during Occupation 33.

Between N1 and N2 on the E8 north-south line was Feature 49. This feature was a meter in diameter, circular in shape, and about 75 centimeters in depth. Its fill was of charcoal and the feature was capped by a layer of rocks. The stratigraphic evidence is not altogether clear, although it did appear that Feature 49 was intrusive from the bottommost layer of Zone VI; therefore, it was also assigned to Floor 20, Occupation 33. Feature 1 of Occupation 36 cuts through the edge of Feature 49, further confirming this assignment. Many burned *Agave* leaves and quids and corn cobs attested to the fact that the inhabitants of Area B of Occupation 33 were cooking food, perhaps for some sort of special ceremonial feast for the burials in Pits

61 and 66. Also occurring in Area B were end- and side-scrappers, a muller, a mano, a blade, a point, flint chips, knots, string, textile, other plant remains, and deer and peccary bones, but whether or not they were deposited by people of Occupation 33 on Floor 20 could not be determined. In fact, these artifacts and ecofacts could have belonged to any of the floors from 20 to 23 or any combination of these floors and could not have been connected with the occupation of Area A or Area C or both. They suggest a wide variety of activities: the San Nicolas point, end-scraper, side-scraper, and blade with deer and peccary bones are possible evidence of hunting and butchering. The chips and cores may indicate flint-knapping, and the various kinds of string and knots, in association with the coiled basket, molded grass container, and sandals, may be taken as evidence of string and textile manufacture. The main concern, however, seemed to have been with plants, for a wide variety of these were in abundance. Also, since only a muller, a mano, and a scraper-plane occurred, this main concern with plants was perhaps with the planting, collecting, and harvesting of them, rather than with their preparation for food. It might be added that one piece of bark cloth and a sandal suggest a ceremonial concern.

It is, however, in Area C from S3E7 east to the E15 axis (the edge of our excavated area) that we got our best glimpse of the activities of the second group of inhabitants of Zone VI, that is, Occupation 33. In this activity area were two refuse pits, Feature 22 and Feature 59. The latter area had the largest concentration of animal bones in the site and was the area where one of the largest quantities of preserved plant remains was found. Not found in this area were most types of artifacts except for one muller fragment. One Pelona projectile point was included in the remains found in Pit 22. However, it was Feature 61 and associated Feature 66, which showed that the people of Floor 20, Occupation 33, were involved in things more elaborate than the mere collecting, harvesting, preparing, and cooking of food.

These features, in the eastern section between E10 and E12, were unique in the occupation of the Coxcatlan Rock Shelter. One of these, Feature 61, was a burial pit in which a child approximately 15 months old had been placed (Fig. 124). Associated with this was Feature 66, a large shallow depression that contained posts and post molds within it. Since the stratigraphic evidence suggests that Feature 66 was earlier and that Feature 61 cut into it, we shall first describe Feature 66. This shallow pit extended from the E10.5



Floors 21-23, Occupations 34-36

Activity Area A

- Hunting, trapping and butchering
 - 16. Cactoid
 - 12. Blunt end, atlatl foreshaft fragment
 - 4. Crude blade, prepared platform
 - 7. Side scraper fragment
 - 9. Thin flake end scraper
 - 38. Other, white-tailed deer
 - 30. Vertebra, white-tailed deer
 - 31. Iliac, white-tailed deer
 - 34. Ulna, white-tailed deer
 - 64. Humerus, cottontail
 - 9A. Fox
 - 32A. Turkey
 - 1. Overhand knot (bowl)
 - 2. Overhand knot (bowl)
 - 16. Slip knot
 - 33. Square knot
 - 42. Bark coil
- Plant collected and preparation
 - 19. Metate fragment
 - 2. Two half hitches, carry loop
 - 10. 2-ply coarse cord, 2-twist (bowl)
 - 20. Prosopis juliflora seeds, mesquite
 - 22. Cassinina edulis, white bean
 - 5. Zea mays maize
 - 6. Acrocomia mexicana (coyol)
 - 8. Persea americana (avocado)
 - 20. Prosopis juliflora seeds, mesquite
 - 22. Cassinina edulis, white bean
 - 27. Cyrtocarpa procera (chupandilla)
 - 27. Spodopis mombin (cruet)
 - 29. Ceiba parviflora roots (pochote)
 - 29. Ceiba parviflora roots (pochote)
 - 36. I. Weber fruit (cotton)
 - 38. Opuntia spp. leaves prickly pear
 - 39. Opuntia spp. seeds prickly pear
 - 40. Opuntia spp. fruit prickly pear
 - 43. Sideroxylon cf. tempsquique (coshuico)
 - 67. T. landyia spp. leaves
 - 64. T. landyia dasyrrhiza
 - 62. Bark
 - 63. Wood
 - C. Number of sherds per square

Plant knapping

- U. Number of flakes without platforms per square
- P. Number of flakes with platforms per square

Spring-summer occupation 32 - Floor 20

Activity Area A1

- Plant and animal food preparation
 - 19. Crude blade fragment
 - 19. Side scraper fragment
 - 6. Flat-topped scraper-plane
 - 20. Boulder, metal-milling stone
 - 21. Wood muller
 - 8. 2-ply coarse cord, 5-twist (bowl)
 - 10. 2-ply coarse cord, 2-twist (bowl)
 - 72. Two half hitches, carry loop
- Cores
 - U. Number of flakes without platforms per square
 - P. Number of flakes with platforms per square
- 38. Other, white-tailed deer
- 30. Vertebra, white-tailed deer
- 31. Iliac, white-tailed deer
- 34. Ulna, white-tailed deer
- 64. Humerus, cottontail
- 9A. Fox
- 32A. Turkey
- 1. Overhand knot (bowl)
- 2. Overhand knot (bowl)
- 16. Slip knot
- 33. Square knot
- 42. Bark coil

Summer-fall microband occupation 36 - Floor 23

Activity Area B

- Roasting Pit 1
 - 19. Metate fragment
 - 7. Side scraper fragment
- Cores
 - U. Number of flakes without platforms per square
 - P. Number of flakes with platforms per square
 - C. Number of sherds per square
- 38. Other, white-tailed deer
- 30. Vertebra, white-tailed deer
- 31. Iliac, white-tailed deer
- 34. Ulna, white-tailed deer
- 64. Humerus, cottontail
- 9A. Fox
- 32A. Turkey
- 1. Overhand knot (bowl)
- 2. Overhand knot (bowl)
- 16. Slip knot
- 33. Square knot
- 42. Bark coil

Activity Area A

- Roasting Pit 3
 - 25. Matamoros
 - 5. Zea mays maize
 - 10. Zea mays seeds
 - C. Number of sherds per square
- Fire Pit 11

Spring-summer microband occupation 34 - Floor 21

Activity Area A

- Storage Pit 12
 - 3. Undentified grass seeds
 - 5. Zea mays maize
 - 43. Sideroxylon cf. tempsquique (coshuico)

Fall microband occupation 35 - Floor 22

Activity Area A

- Roasting Pit 16
 - 19. Metate fragment
 - 5. Zea mays maize
 - 6. Acrocomia mexicana (coyol)
 - 26. Cyrtocarpa procera (chupandilla)
 - 29. Ceiba parviflora roots (pochote)
 - 31. Ceiba parviflora roots (pochote)
 - 38. Opuntia spp. leaves prickly pear
 - 39. Opuntia spp. seeds prickly pear
 - 43. Sideroxylon cf. tempsquique (coshuico)
 - 62. Bark
 - 63. Wood

Floors 20-23

Activity Area B

- Hunting and butchering
 - 13. San Nicolas
 - 10. Crude discoidal end scraper
 - 7. Side scraper fragment
 - 10. Thin flake side scraper, one edge retouched
 - 3. Crude blade, unprepared platform
 - 38. Other, white-tailed deer
 - 41. Maxi-lac, peccary
- Plant harvested and preparation
 - 18. Muller or mano fragment
 - 21. Wood muller
 - 7. Setar ad. macrostachya
 - 5. Zea mays maize
 - 6. Acrocomia mexicana (coyol)
 - 8. Persea americana (avocado)
 - 20. Prosopis juliflora seeds, mesquite
 - 26. Cyrtocarpa procera (chupandilla)
 - 27. Spodopis mombin (cruet)
 - 29. Ceiba parviflora roots (pochote)
 - 32. Eschscholzia (chupandilla)
 - 38. Opuntia spp. leaves prickly pear
 - 39. Opuntia spp. seeds prickly pear
 - 43. Sideroxylon cf. tempsquique (coshuico)
 - 44. Sideroxylon cf. tempsquique (coshuico)

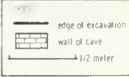
Plant knapping

- U. Number of flakes without platforms per square
- P. Number of flakes with platforms per square

Ceremonial activities

- 61. Two half hitches of bark, dh tied together
- 61. Sand

Fig. 123. Activity areas of Zone VI of Tc 50.



Other artifacts

- * 11 coarse yarn, 5-twist ragavel
- 52 bark cloth piece dyed black
- 29 square knot with loop, in 2-ply, 5-twist bast string
- 2 cut stick
- 3 cut log or stake
- 14 cut slab
- cores

U number of flakes without platforms per square
P number of flakes with platforms per square
C number of shreds per square

area to the E12 line, had irregular outlines, and had been dug into the previous deposits. Zone VI was very compact and narrow at this point and the delineation of floors is unclear. The sharp rim of the pit was identifiable in the bottom of Zone VI and intrusive into Zone VII below it, and therefore we have assigned it and the burial pit to Floor 20. In this associated pit were the remains of some small stakes, about 3 cm. in diameter, and post molds where other posts had been located. The pit itself was filled with a great quantity of refuse including human excrement, basket fragments, pieces of wood, leaves, seeds, and other plant remains. The pattern of the stakes was irregular, although generally around the edge of the pit. There were two other stakes to the east, one at S1.9E12.55 and another one at S0.55E12.85, not located on the line plot (Fig. 123). Since these post molds were of the same area, it is suggested that they were related to Feature 66.

Slightly intrusive into Feature 66 was Feature 61. This intrusion appears to be almost immediate and it is our strong feeling that these two features were closely associated with each other, Feature 61 following Feature 66 by a very short period of time. Feature 61 is also irregular in outline and very shallow, about 35 cms. at its deepest point. It extends from the E10.5 area over to E11.3 and from the S2 area to S.6 (Fig. 123). In the western half of this pit was found Burial No. 1, a young child 15 months old wrapped in two blankets tied with a twine-like rope, the burial and the wrappings having been described in earlier volumes in this series (Vol. 1, p. 100 and Vol. 2, p. 198, Figs. 159 and 160). On the west side of the burial a series of slab rocks about 60 cms. square leaned up against it, and to the south of these were fragments of a hard mud mixed with some rock fragments. Associated with the rock fragments was a layer of brown clay material that appeared to have been plastered over the surface of the rocks. The rocks appear then to have been a protective covering for Burial 1 (Fig. 124).

The area of the pit around the burial was filled with a loose black-brown soil, except for the southwest corner where a large quantity of trash including various plant remains, human coprolites, and other materials were found. The south limit of the burial pit was defined by the wall of the rock shelter itself. The appearance of this burial was altogether unique in this site. The individual buried was so well preserved that fragments of desiccated skin and hair were present on the bones; also, the blankets were very well preserved. Further, there are implications that a funeral ceremony had been carried out at the spot. The material in Fea-

ture 66 suggested a feast activity, and it is tempting to think of the poles as supporting a platform upon which the burial rested before it was placed into the ground. The poles may have supported foodstuffs, which were eaten, or may have served as some sort of markings for the ceremony that was taking place. At any rate, following the construction and utilization of Feature 66, a shallow pit was dug and Burial 1 put in place. It was partially covered with rocks and a daubing or plastering of mud and then the area filled over with a loose brown soil. Further feasting activity may have occurred at the same time; in the southwest corner of the burial pit was found a trash deposit of largely plant food remains.

Besides these four pits in Activity Area C, there were a number of artifacts and ecofacts pertaining to a fair number of activities, but assigning any of them to any of Floors 20 to 23 would be impossible. It should be added, however, that the area as a whole does bear a resemblance to Pit 59 of Floor 20, Occupation 33, for it had bones of a wide variety of animals—deer, peccary, rabbit, fox, skunk, lizard, dove, and song bird—and, like Pit 59, it had few artifacts, except for an endscraper, evidence that these animals were hunted, trapped, and butchered in this location. Also, there was a wide variety of wild and domesticated plants and a very few grinding stones, so again, it looks like these people were involved in planting, collecting, and harvesting plants rather than preparing them for food. Further, many of the corn cobs had cut glumes, suggesting they were shucking the corn from their harvest so they could then take it to use in their homes in the nearby hamlets, villages, or towns. A few pieces of string, knots, bark cloth, cut wood, chips and cores, and sherds occurred, but whether these meant they were involved in other activities in this area, or were merely dumping refuse here, is difficult to say.

Determining the activities of Occupation 34 on Floor 21 is more difficult because only a storage pit (Feature 12) in Area A could definitely be assigned to the floor; and, while an extension of this occupation may have existed in Areas B and C, it was difficult, if not impossible, to determine what artifacts and ecofacts in those areas pertained to it.

Located in the 1-meter area between 0 and E1, and the 0 east-west line and N1, Feature 12 was sealed over by Floor 22 and cut through Floor 21; we have assigned it to Floor 21. This shallow pit approximately 30 centimeters in diameter indicated no evidence of fire or burning. We are suggesting, therefore, that it probably represented a small storage pit in this area. Again this pit contained many spring seeds as well as

maize and fruits, suggesting the occupants of Occupation 34 were involved in summer harvesting and perhaps spring planting, as well as storing this produce and perhaps transporting it to the Palo Blanco hamlets, villages, and towns in nearby parts of the valley.

Occupation 35 on Floor 22 was just as poorly represented. Only Feature 16 located in Activity Area A could definitely be assigned to it; however, the occupation may have extended into Areas B and C.

Feature 16 was located at the W1 stake. It was oval in shape, nearly two meters in a north-south axis and a meter and a half in an east-west axis. This pit has been classified as a roasting pit based upon the alternating layers of charcoal and ash that composed its fill. This class of pit had not been recognized previously in the lower levels of habitation of the Coxcatlan Rock Shelter. It represents a new functional distinction and a new activity carried on at the site. Whether these pits were used for roasting such food as the meat of animals, or whether they were roasting pits for the preparation of the large maguey leaves, is not yet determined. Again, there was a wide variety of domesticated plants including corn and cultivated fruits associated with the pit, as well as a metate. Thus, once again the ecofacts suggest a fall harvesting visit to the cave, but this time accompanied by some special roasting endeavors.

Floor 23 was discernible at the top of the zone in both Areas A and B, and, although not evident in Area C, may also have capped it. Probably many of the artifacts in all three areas not assignable to the various earlier features belonged to this occupation. There were, however, three definite features and their inclusive artifacts and ecofacts that could definitely be assigned to this final 36th occupation of Zone VI.

In the northeast part of Area A and intrusive into it from Floor 23, was another roasting pit, Feature 3. This feature was about a meter and a half in diameter and composed of alternating layers of ash and charcoal with some large rocks at the bottom of the pit. It was roughly basin-shaped and approximately a meter in depth in the central portions.

Centering at the 0-0 stake was Feature 11, classified as a fire pit. This feature was 75 centimeters in diameter and contained charcoal and burnt rocks, indicating its use for fire. It was much shallower than the roasting pits in Area A and appeared to be intrusive from Floor 23. The largest feature encountered at the Coxcatlan Rock Shelter was Feature 1, which covered the area between the 0 east-west line and the N2 line extending from E5 eastward to E8. The shape of the pit was squarish and basin-shaped and it extended down



Fig. 124. Burial 1 of Tc 50, wrapped in its brightly-colored blankets, in Zone VI, as viewed from the north.

to a depth of a meter below its point of intrusion. The fill of this pit was composed of layer after layer of charcoal and rocks, and, at the time of the abandonment of Zone VI, it left a depressed area in the ground, which was then filled in by deposition of material from Zones V, IV, and III. Stratigraphic data indicated that this roasting pit was apparently intrusive from the upper portions of Zone VI, and so it was attributed to Floor 23, Occupation 36.

Thus, the final set of visits to Zone VI was slightly different than the previous ones, for, while they still may have been collecting and harvesting plants and perhaps doing a little hunting, a major activity in this period was roasting and cooking in special basins. Perhaps these foods, once cooked, were transported to permanent homes elsewhere.

The ceramics are readily assignable to Early Palo Blanco times and are in agreement with the radiocarbon determinations of A.D. 5 ± 200 for Burial 1 in Floor 20 and A.D. 180 ± 100 for Floor 23 in S1E15 (I-656, I-921) (*Radiocarbon* 11:91, 93).

The Way of Life of Zone V

The second zone of occupation (Occupation 37)

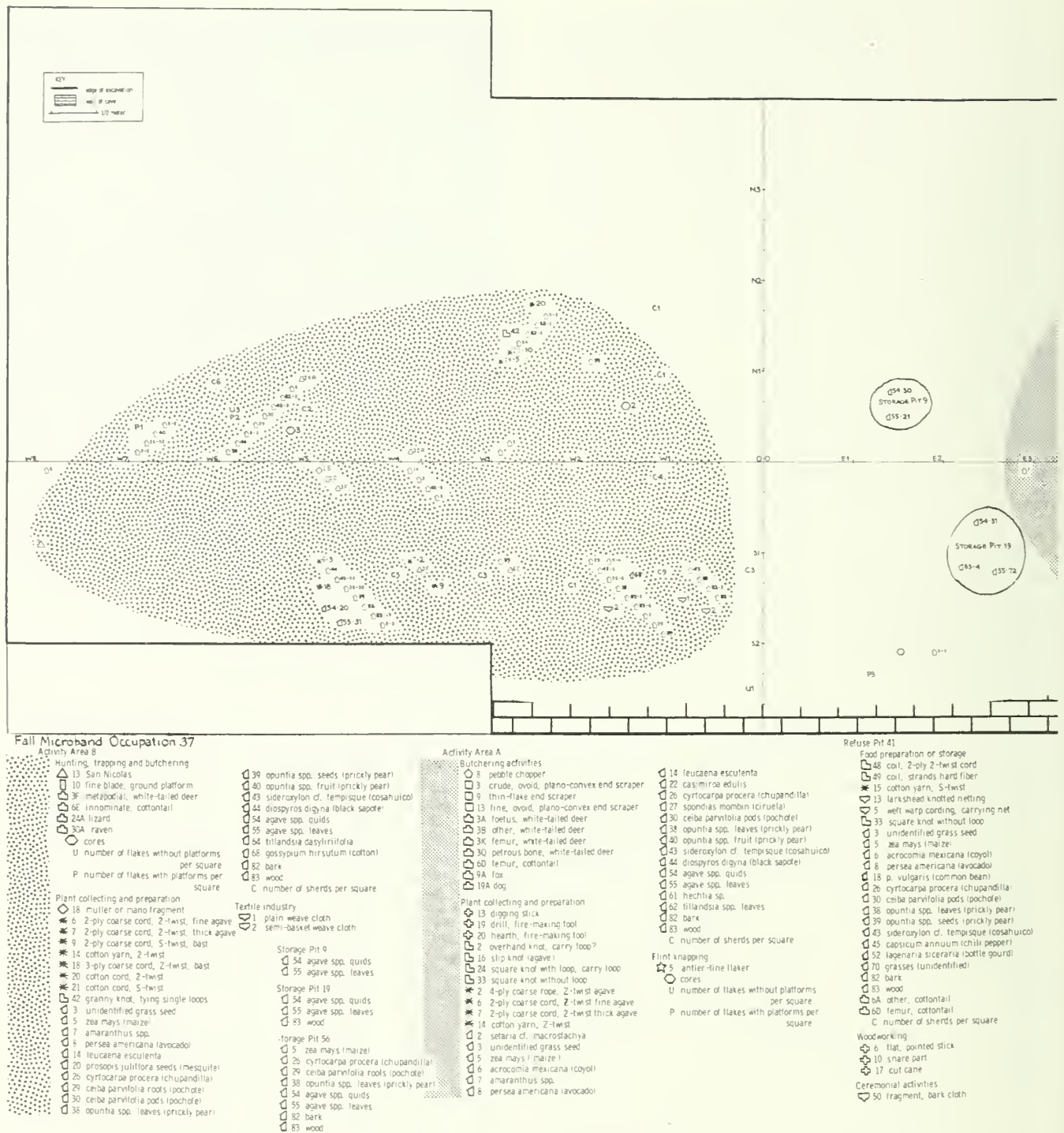
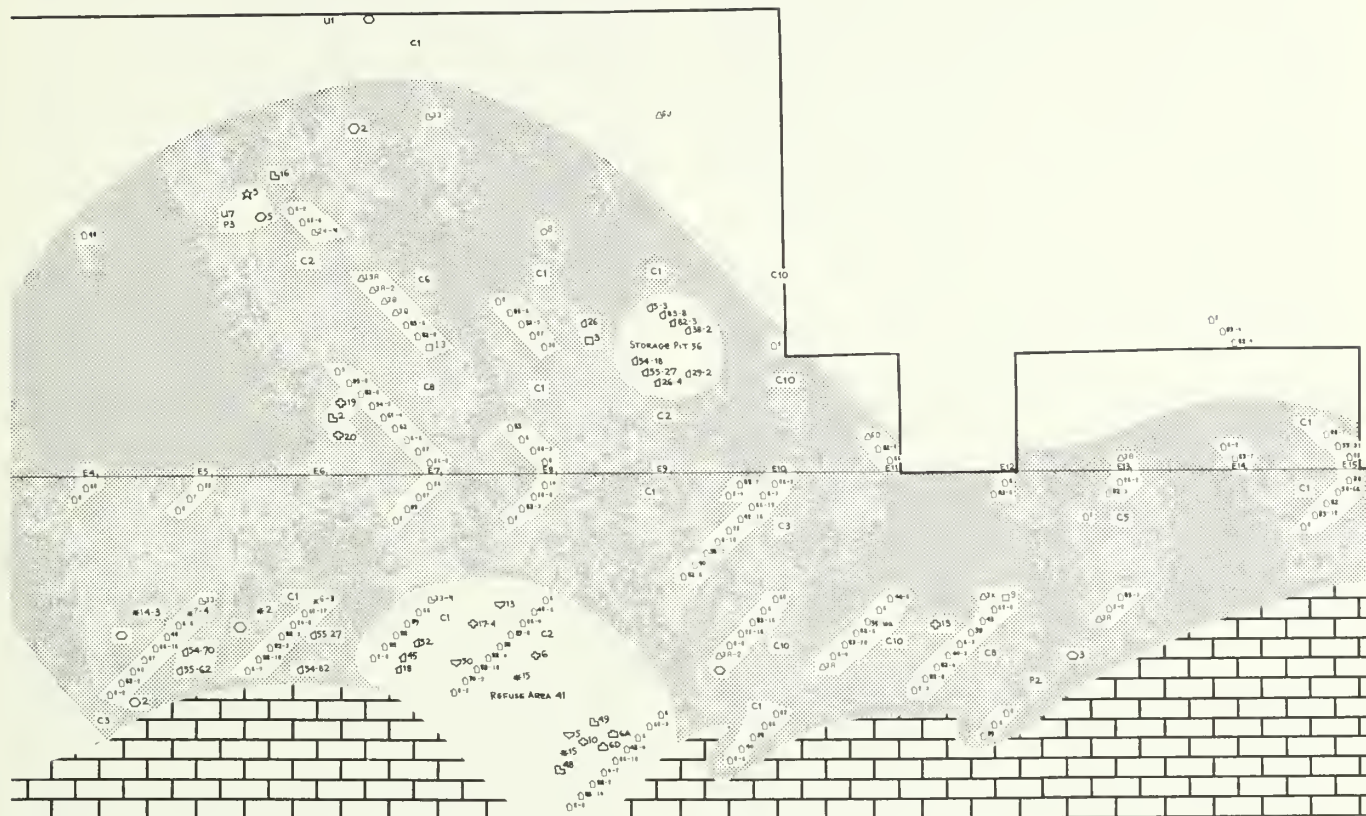


Fig. 125. Activity areas of Zone V of Tc 50, with a key to their artifacts and ecofacts.



(Fig. 125 continued)

representing the Palo Blanco Phase at the Coxcatlan Rock Shelter was Zone V. Although much smaller and more limited in area than Zone VI, still it represented essentially the same type of occupation wherein a large quantity of preserved plant remains and very few artifacts indicate a human activity largely concerned with the processing of plant food. Zone V was capped by a recognizable Floor 24.

Deposits and materials attributed to this zone were concentrated primarily in the eastern half of the area excavated and extended from approximately E3 eastward to the E15 line edge of excavation. Small traces of this zone were also found in the western portion near the large rockfall at W3 and beneath a more recent smaller rockfall on the S1 line between W5 and W3. The zone varied in color. In the eastern portions it was largely yellow, changing to a dark charcoal-laden black between E9 and E10 and appearing as a gray, ashy material in the west. Preserved plant ma-

terial was found throughout the zone, with the exception of the extreme eastern portion which was made up of yellow rock dust and rock fragments.

In attempting to delineate activity areas for Zone V, it appeared probable that the major distribution in the eastern part of the zone represented one single activity area, Area A, a distribution evident from E2 on eastward to the E15 line (Fig. 125). The features from this area were storage or garbage pits. No fire or roasting pits were present to indicate a continuous stay by these occupants. In the area between E1 and E2 between the 0 east-west line and the N1 line, Feature 9 was an ill-defined pit which intruded from this zone into the lower zones below. Part of the problem in recognizing this pit was the fact that it was cut through by a later pit, Feature 5, which extended from Zone II downward into Zone V and VI. Despite the ambiguity, Feature 9 has been identified as a possible storage pit, due to the fact that there was no evidence of burning

within the pit confines and that some preserved plant remains were found in the locality. The pit itself contained *Agave* quids and leaves.

Another storage pit was found just southeast of Feature 9 along the S1 line between E2 and E3. This pit, Feature 19, was intrusive from Zone V into Zone VI and can be described as a shallow, basin-shaped pit approximately 60 cms. in diameter. Another shallow, basin-shaped pit 50 cms. in diameter was found at N1E9 and numbered Feature 56. It was filled with plant remains and was also classified as a storage pit.

The largest feature located in this zone was Feature 41. It extended diagonally from S1E7 southward to S1E9, 2.25 meters in length and a meter in width. This refuse pit or area was defined largely as a concentration of plant remains and other material up against the rock wall of the bluff that defined the southward limits of this occupation floor. It was as if the material here had been pushed back against the overhanging rock wall in an area where the roof of the shelter was too low for people to inhabit comfortably or to move about successfully. The concentration of plant remains found in this pit was one of the largest on the entire floor.

Artifacts made of fiber materials including textile fragments, string fragments, and strings tied into knots were found in three major areas of concentration: one in the western one-third of the site south of the N2 line at about W2; another between E4 and E7 and S1 and S2 just to the west of the refuse pit; and a third in the area S1-S2, W3-W5. Whether this means they were weaving here or merely lost fabrics woven elsewhere is difficult to determine, but we suspect it is the latter.

Only one San Nicolas point came from this zone and only a sparse number of chips, bifaces, end-scrapers, blades, and grinding tools, but there were many sherds. One of the characteristics of Zone V is the almost complete absence of stone artifacts.

Large quantities of plant remains both wild and domesticated occurred in Area A—chili, amaranth, avocado, gourds, sapote, cosahuico, chupandilla, ciruela, common beans, and corn, the dominant domesticated plant.

The maize fragments indicated that neither wild maize nor the early cultivated varieties were present. One cob of early tripsacoid was found. The most common corn type found in this zone was that designated by Mangelsdorf as late tripsacoid—298 cobs and cob fragments were recovered. Second to this in quantity were 287 cobs and cob fragments of Nal-Tel and Chapalote. The only other variety of corn repre-

sented in Zone V was two cobs of the slender pop variety. This confirms the previous indications from Zone VI that, during the Palo Blanco Phase, the specialization in types of corn utilized was becoming definite and that selected varieties were being grown.

On the basis of these plant remains it is suggested that at least 66% of the food of the people from this floor was obtained from domesticated plants and that approximately 19% was obtained from wild plants.

One concentration of bones was in the area of N1E7, where remains of a yearling deer and the fetuses of two individual animals were identified. The other concentration of animal bones was between E8 and E13 in the S1 to S3 area. This was composed of gray fox bones, probably one individual, and the remains of a yearling deer and a fetal deer. Remains of mice were probably those of the intrusive rodents in the area.

Some coprolites were found in Area A of Zone V; although not tabulated by Callen (Vol. 1, p. 275) his analysis suggested that some of these represented meals on maguey with a combination of fruit and meat. Two other coprolites contained remains of the common bean, pineapple, lily buds, and roasted maguey tissue. Callen suggests that they had a meal that indicated the possibility that large quantities of "beer" had been consumed.

Most of the data from both Area A and Area B suggested that Zone V of the Coxcatlan Rock Shelter was occupied during the latter part of the wet season from August on, for a period of about two months. This is based upon the kind of plant materials recovered, the indication from the coprolites, and Flannery's analysis of bones.

There was no evidence that this activity area was in any way a permanent residence, nor from the artifacts did we get any indication of any major activities related to their manufacture. It is our opinion that in Zone V the Coxcatlan Rock Shelter was used as a fall way-station in the processing of plant foods, particularly the domesticates that must have been grown in the environs immediately adjacent to the rock shelter. At the same time the people were collecting other plant foods and storing them in the rock shelter, until they could transport them to whatever nearby town that served as the center of their activity.

The specialized sub-area within Activity Area A between E8 and E13 and S1 to S3, which we have previously described as a concentration of small animal bones, suggests an area where these small locally hunted mammals were eaten. This is in keeping with

the idea that Occupation 37 was a small temporary camp in which the major emphasis was on the harvesting of fall crops and the processing of vegetal foods.

The other area of activity, Area B, was outside the main area of distribution. Traces were found near the large rockfall in the vicinity of N2W4 and southward from this point under the new rockfall apparent in this area. Except for sherds and string there were few artifacts here, excepting bones of a deer and a cottontail. A concentration of plants to the southeast of the large rockfall included many maize fragments like those of Area A and remains of other plants, largely wild, but including avocado and cotton remains. The sherds and string may have been mainly concerned with collecting and storage of these plants. These data indicate Area B had almost the same kind of function as apparently had the other activity area but in its materials it was not as well represented as Activity Area A. No human coprolites were found in Area B, which would suggest that here, as well, residency was impermanent, by a small group, and used simply as a storage or food processing area.

Pottery types again indicated that one or more visits of Occupation 37 took place during Late Palo Blanco times. A single sample of carbon from Activity Area A in Square S2E11 gave two radiocarbon determinations of A.D. 325 ± 120 and A.D. 50 ± 150 and an average date of A.D. 187 ± 96 (I-671, I-673) (*Radiocarbon* 11:92).

The Way of Life of Zone IV

The deposits attributed to this zone were found between E15 and W7 in a narrow band within a meter to three meters from the back of the rock shelter wall. Between E3 and E10, however, these deposits expanded northward to the N4 line. The distribution is in the shape of a normal bell-shaped curve (Fig. 126). The zone was composed entirely of preserved plant remains with only some slight traces of ash and was capped with a very thin organic floor. This is the 25th occupation floor.

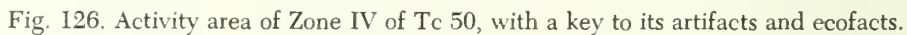
Plotting of the artifacts and ecofacts did not reveal any significant concentrations or activity areas, so we shall describe the remains found on the floor as a single unit even though they may represent more than one occupation.

Plant remains were scattered over the entire area of occupation Floor 25, although not in the quantities that had been observed in Zone V. These included the domesticates we have seen before as well as seeds and stems of amaranth. It is estimated that the domesticated plant foods, that is, of the kinds of crops being

collected in the vicinity of the Coxcatlan Rock Shelter at this time, represented some 69% of the people's diet, whereas only 16% came from wild plants and 14% came from animal foods. Within this distribution of preserved plant remains, one large concentration seemed to be in the area from E7 to E11 from the 0 east-west line southward to S2, with a particularly heavy concentration in Square S2E8. This concentration was largely one of wild plant food, although some maize had been found from this area. North of the east end of this concentration was Feature 56, a reused storage pit. Another concentration was to the southwest of intrusive Feature 40 of Zone III between W2 and E3 from S1 southward to S3. Near here occurred a small reused storage pit, Feature 9, in Square E2. In this area is a very low spot in the deposition of the rock shelter material. The overhanging bluff slopes out so sharply here that it would not have been possible for habitation to take place back under the bluff and, as in the previous Zone V, it appears that this was used as a place to deposit plant remains in either a refuse or a storage area, thus accounting for the concentration of plant remains.

Of the numerous corn cobs and fragments of corn plants recovered from this level, Mangelsdorf identified the largest quantity of them (600) as representing Nal-Tel and Chapalote races. The second most common kind was late tripsacoid represented by 559 cobs and cob fragments. Early tripsacoid represented by 41 cob fragments was much less common. Slender pop varieties showed a much greater increase over previous levels; another type represented was Zapalote Chico. As seen in the previous Palo Blanco occupations the emphasis continued to be on a much more restrictive selection of varieties of corn being grown as compared to the previous zones of occupation.

Animal bones found in this deposit included deer bones representing two individual deer, and bones of one individual Audubon cottontail and one Mexican cottontail. The remains of gray fox and dog were also found, and there was some representation of birds. Intrusive rodents found in the site numbered six rats and one kangaroo rat. There was only a slight suggestion of concentration of these bones, one of these at the western end of the site. The other bones were scattered more or less through the eastern half of the occupation of Zone IV, which contained 6 human coprolites, 5 from the same location. The materials found in these coprolites did not suggest the same proportions of food in the diet as did the distribution of plant remains in their proportionate representations in the total food



materials recovered. As in previous Palo Blanco zones, the indications from the coprolites are that the people were eating wild plant foods, including cactus, pochote, and *Setaria* grass. We have the same suggestion that, if the rock shelter were occupied for any great length of time, it was probably during the harvest season, the latter part of the wet season, and that the people were there largely to plant corn with digging sticks, tend the crops, and harvest the food resources available to them in the area.

A large quantity of fabrics were preserved at the site which included textile fragments, *Agave* coils, quids, and cotton yarn, pieces of string with knots in them, some carrying loops, parts of mats, and other perishable string fragments. These are associated with a spine needle, bone awl, spine pin, possible weaving picks and a comb of sticks, and a weaving comb. This suggests they were making string and possibly weaving, perhaps to supply fabrics and string to assist in their harvesting activities. Relative to the food remains and textiles, the other artifacts were very scarce. There were three projectile points found, one discoidal and one ellipsoidal chopper, some scraper-plane fragments, some end-scrapers to the north of the major deposition, a few blades, and some fragments of metates and mullers. All these could have been used in butchering, skin-scraping, and plant-processing during their brief stay; the relative lack of chips and cores suggests they were not made here. On the basis of these data, it would be very difficult to be specific about activity areas.

On an overall view, one gets the impression that this zone, like the previous ones, had as its prime purpose the harvesting and storage of agriculture produce, which ultimately was transported to their permanent habitations. The sherds again reveal that it, too, was of Late Palo Blanco times and vegetal remains from S2E11 gave a radiocarbon determination of A.D. 325 ± 150 (I-663) (*Radiocarbon* 11:91).

The Way of Life of Zone III

There was evidently a fairly long period before the next occupation of a new culture, Venta Salada, in Zone III. Zone III extended in a band about 3 meters to 4 meters in width along the rock shelter wall from W5 eastward to E13. It was probably wider than this in the times of its occupation, but it was clearly recognizable only in this area described. Compared to earlier floors it was somewhat level; there was only an 80-centimeter difference in elevation from the W5 area in the vicinity of the large rockfall to the E13 area in the east. This zone was composed entirely of vegetal

remains and was dark yellow to black in color. The vegetal floor capping of this zone is the 26th floor of the 39th occupation.

There seemed to be two concentrations of plant remains (Fig. 127). One of these was Area A, west of the W1 line; the other one, Area B, was the area east of E1 to the E15 line. In both of these, plant remains found were of large quantities of domesticated plants, including varieties of squash, cotton, avocado, amaranth, three varieties of sapote, as well as remains of beans. Plant remains in both of them (as well as fetal deer remains) suggest a late summer-fall occupation and suggest they are contemporaneous. This is in keeping with the large quantities of plant remains, particularly domesticates and particularly of *Zea mays*. It is probable that this zone was occupied as a harvesting station, where corn and other plants were harvested and processed to be taken back to the central town. That these plant remains were processed at the site is indicated by the maize plants, represented almost exclusively by cob fragments, often with cut glumes; furthermore, no kernels were found in the zone. This suggests that the corn was harvested and shelled, and the shelled corn then was carried to some other locality.

The dominating feature of Activity Area A was Feature 40 located between E7 and E10 and S1 and N1. This is a large pit that in its surface manifestation was of a roundish-square outline and in cross-section was conical in shape. Classified as a roasting pit, it had the same characteristics of similar pits in the earlier Palo Blanco occupation floors. Just to the west of Feature 40 was a ridging of the soil about 10 cms. in height, extending from E7 westward to about E4, about a meter in width. This may represent the material excavated from the Feature 40 area in the conception of that pit. Therefore, it is assumed that materials found in the area of this ridging would be disturbed materials and should not be utilized in analysis of activity areas and habitation activities. Disturbance from Feature 40 extended as deep as Zone VI.

Another feature was located between E2 and E1.5 south of the S2 line. Like the zones beneath it, this depression in an area where the rock shelter wall slopes sharply forward suggests there was not enough height for occupation or human activity. In this depression, labeled Feature 21, was a concentration of preserved plant remains, mostly of maize, wooden tools, fabrics, and string, and it has been classified as a refuse area. The wooden tools and cut sticks suggest the people of Area A may have been involved in woodworking, but

exactly where they did this could not be determined.

Another depression was located between E6 and E8 south of the S1 line. This depression did not have any quantity of materials in it and therefore had not been labeled as a feature. Rather, it seems to have been a depression where the rock shelter wall was too low for activity and therefore deposits did not build up in that area.

Plant remains make up almost the total material from this area and the largest quantity of these is in the area of Feature 21, the refuse area. There were, however, some bones, mostly the remains of small animals, cottontail, fox, and bobcat, with some fragmentary deer remains, located between E10 and E12 between S1 and S2.

Analysis of the coprolites from this area by Callen (there were four recovered) suggests that the people were eating wild plant foods. In one coprolite, however, a quantity of bean remains were found. In two coprolites some evidence of meat was found. The major impression for the Venta Salada Phase is, however, that the major portion of the diet of people living in the Coxcatlan Rock Shelter was from wild foods, such as the pochote and cactus.

A very small quantity of stone artifacts were recovered from Area A. This included Catan, Palmillas, Garryito, and Pelona projectile points, some end-scraper fragments, many sherds, and some fragments of manos and metates. The projectile points, perhaps dug up from earlier deposits, were located in the area of Feature 21 and the metate and mano fragments were found in Feature 40.

The largest number of artifacts recovered from this zone were preserved fragments of mats, string, textile fragments, and some sandal fragments, suggesting a textile industry. These were concentrated around Feature 21, although a few knots and pieces of string occurred further east.

Area B to the west had even fewer artifacts; only a few sherds and chips but 4 textiles, cloth, a sandal, bark cloth, yarn, string, rope and knots suggesting weaving, and abundant plants like those of Area A. There also were bones of a deer and its fetus, rabbit, skunk, hawk, 2 other birds, and rats. The deer was probably butchered at the site, the bones discarded, and the meat carried back to another locality. This is suggested by the fact that the deer remains recovered were largely leg or foot bones and a maxilla, suggesting the removal of the feet and perhaps the jaw or head of the deer, the remainder of the animal being carried back to the central town. This is also true of the small-

er animals where the remains found were fragments of radii, mandible, and foot bones.

In analyzing all of the food data from both activity areas, it seems that 87% of the food harvested by the people of this Venta Salada Zone III occupation came from domesticated plants, but, on the basis of the coprolites, it would seem that the harvester had a diet mainly derived from wild plant gathering activities, with only a small amount from domesticated plants and the remainder from animal hunting. In the Venta Salada Phase, as was true in the Palo Blanco Phase, activities at the site apparently were directed toward the harvesting of domesticated plants and their processing, as opposed to the actual food that was being eaten by the few people who occupied Zone III.

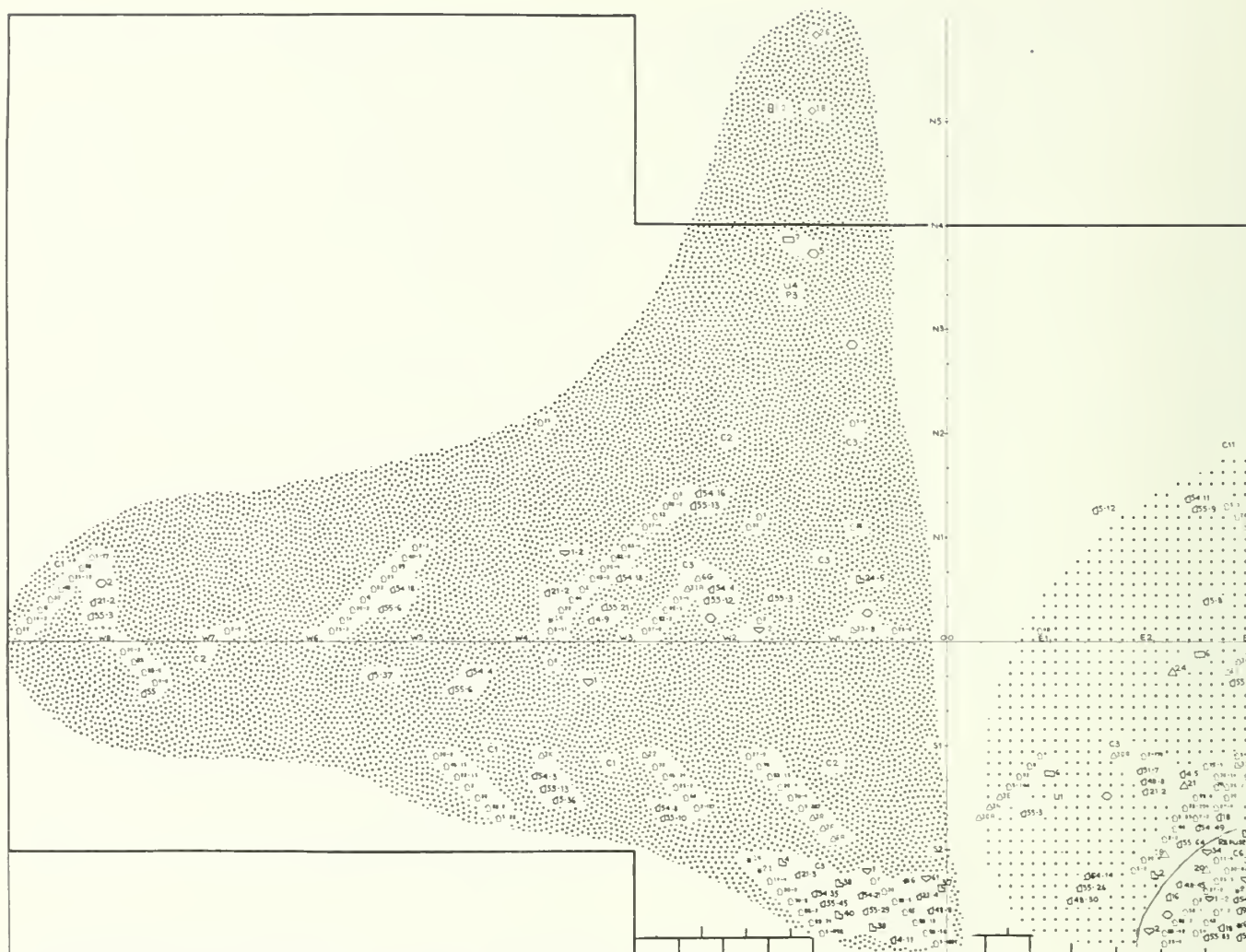
The sherds from this zone indicate that it must be considered as a component of the Early Venta Salada Phase. A radiocarbon determination on vegetal remains from Area A (in Square S2E11) yielded a date of A.D. 900 ± 110 (I-659) (*Radiocarbon* 11:91).

The Way of Life of Zone II

Zone II extended over the whole area of excavation and was capped by Floor 27. The most clearly recognizable traces of this floor were east of the W2 line and south of the N2 area (Fig. 98). The major part of the floor was relatively level, dropping only one meter in elevation from the W2 area eastward to the E15 point where it dropped off sharply. This zone was made up almost exclusively of preserved plant remains with some ash and charcoal mixed in it. Two large activity areas were located in the west (Area A) and the east (Area B), Occupations No. 40 and No. 41 (Fig. 128).

The major feature of Zone II was a circular pit, Feature No. 5, centered at N1E3 two meters in diameter. It was basin-shaped in cross-section and extended to a meter in depth at its central point. This has been classified as a roasting pit. No other features were attributable to this floor.

A major concentration of plant remains was in the area from 0 eastward to E3 and south of the S1 line and from E4 to E7 along the 0 axis, Activity Area A. This makes a roughly circular area around the roasting pit No. 5. Very few plant remains were associated directly with the roasting pit. By far the greatest quantity of plant remains were of domesticated or cultivated plants and included ones that have been described before. An interesting appearance in this level were the remains of some peanut shell fragments. The other concentration of plants runs from S2 westward to W8, Activity Area B.



Summer-fall Microband Occupation 39
Activity Area B

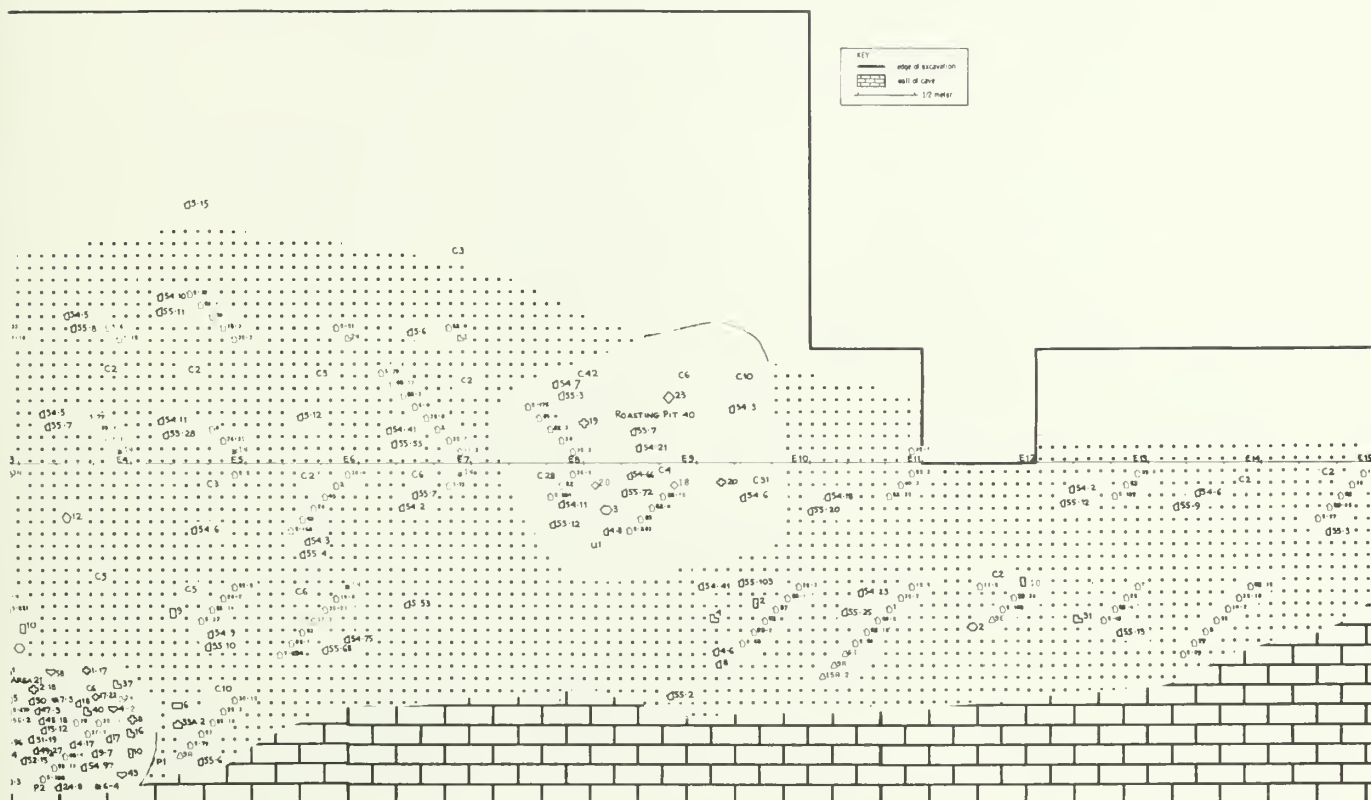
- Plant collecting, harvesting and preparation
- 18 muller or mano fragment
- 20 boulder metate-milling stone
- 26 ovoid, plano-convex metate
- 4 overhand knot
- 22 two half hitches
- 24 square knot, with loop
- 33 square knot, without loop, in hard fiber strands
- 37 square knot, without loop, in grass stalks
- 38 granny knot, in hard fiber strands
- 40 granny knot, in 2-twist hard fiber yarns
- 7 setaria cf. macrostachya
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 17 amaranthus spp.
- 14 leucaena esculenta
- 21 prosopis juliflora quids (mesquite)
- 22 casimiroa edulis (white bean)
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)

- 29 ceiba parvifolia roots (pochote)
- 30 ceiba parvifolia pods (pochote)
- 37 myrtillocactus geometrizans (garambulol)
- 38 opuntia spp. leaves (prickly pear)
- 39 opuntia spp. seeds (prickly pear)
- 40 opuntia spp. fruit (prickly pear)
- 43 sideroxylon cf. temisque (cosahuico)
- 44 diospyros digyna (black sapote)
- 45 unidentified cucurbita spp. (squashes and pumpkins)
- 54 agave spp. quids
- 55 agave spp. leaves
- 64 tilandsia dasylirofolia
- 65 beaucarnea gracilis (sotolin)
- 70 grasses (unidentified)
- 76 mimosa sp. pods
- 82 bark
- 83 wood
- C number of sherds per square

- Hunting and butchering
- 10 fine blade, ground platform
- 2 side scraper fragment
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square
- 3F metapodial, white-tailed deer
- 3K femur, white-tailed deer
- 3R ramus, mandible, white-tailed deer
- 6A other, cottontail
- 6G radius, cottontail
- 31A hawk

- Textile industry
- 6 2-ply coarse cord, Z-twist, agave
- 14 cotton yarn, Z-twist
- 21 cotton cord, 2-ply S-twist
- 1 plain weave cloth
- 2 semi-basket weave cloth
- 61 sandal

Fig. 127. Activity areas of Zone III of Tc 50, with a key to their artifacts and ecofacts.



Activity Area A

- Plant collecting, harvesting, and preparation
- 18 muller or mano fragment
- 20 boulder metate-milling stone
- 23 ovoid mano
- 1 overhand knot, in hard lagave fibers
- 2 overhand knot in bast fibers
- 4 overhand knot in 2-ply, Z-twist bast-fiber cord
- 16 slip knot (lagave)
- 24 square knot, with loop, in hard fiber strands
- 31 square knot with loop, in bark strands
- 33 square knot without loop, in hard fiber strands
- 40 granny knot, tying single loops in Z-twist hard-fiber yarns
- 1 polished stick
- 2 cut stick
- 8 cut or pierced gourd
- 17 cut cane
- 19 drill, fire-making tool
- 20 hearth, fire-making tool
- C number of sherds per square
- 1 dijon edule
- 2 selaria cf. macrosclachya
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)

- 7 amaranthus spp.
- 8 persea americana (avocado)
- 9 acacia spp. pods
- 10 acacia spp. seeds
- 11 acacia sericea pods
- 14 leucaena esculenta
- 15 phaseolus acutifolius (tepeal bean)
- 16 p. coccineus (runner bean)
- 17 p. lunatus (sieva bean)
- 18 p. vulgaris (common bean)
- 21 prosopis juliflora quids (mesquite)
- 22 casimiroa edulis (white bean)
- 24 jalropha neopauciflora
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)
- 29 ceiba parvifolia roots (pochote)
- 30 ceiba parvifolia roots (pochote)
- 37 myrtillocactus geometrizans (garambulito)
- 38 opuntia spp. leaves (prickly pear)
- 40 opuntia spp. fruit (prickly pear)
- 42 bumelia laetevirens
- 43 sideroxylon cf. temisque (cosahuico)
- 44 diospyros digyna (black sapote)

- 47 crescentia cujete (tree gourd)
- 48 unidentified cucurbita spp. (squashes and pumpkins)

- 49 c. mixta
- 50 c. moschata
- 51 c. pepo
- 52 lagenaria siceraria (bottle gourd)
- 54 agave spp. quids
- 55 agave spp. leaves
- 58 yucca periculosa leaves
- 64 tiilandsia dasylirifolia
- 70 grasses (unidentified)
- 75 leucaena pueblana pods
- 77 jalropha sp. seed
- 82 bark
- 83 wood

Hunting and butchering

- 2 fine blade fragment
- 9 fine blade, snapped, two edges retouched
- 10 fine blade, ground platform
- 6 thick flake side scraper, one edge utilized
- 5 domed scraper-plane
- 18 Garyilo
- 20 Catán
- 21 Pelona

- 24 Palmillas

- 12 thin, crude, ovoid bilace

- cores

- U number of flakes without platforms per square

- P number of flakes with platforms per square

- 3A loetus, white-tailed deer

- 3E phalanx, white-tailed deer

- 3N radius, white-tailed deer

- 6I ramus, mandible, cottontail

- 9A fox

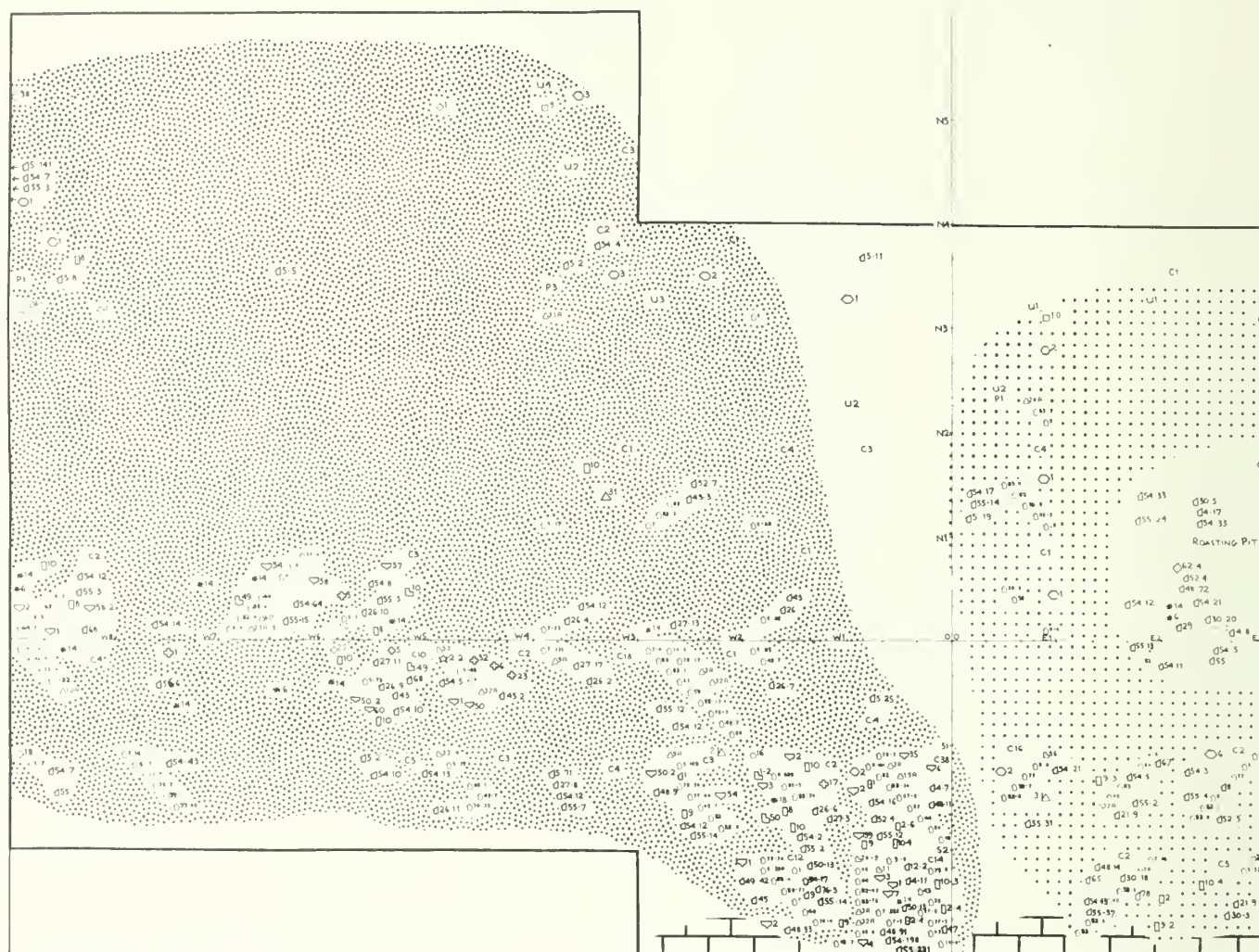
- 10A skunk

- 15A bobcat

- 33A other birds

Textile industry

- 6 2-ply coarse cord, Z-twist, line hard (lagave) fiber
- 7 2-ply coarse cord, Z-twist, thick hard (lagave) fiber
- 14 cotton yarn, Z-twist
- 22 6-ply coarse rope, Z-twist
- 1 plain weave cloth
- 2 semi-basket weave cloth
- 4 warp-stripping cloth
- 34 split-slitched coiled bundle foundation basket
- 43 petate
- 56 single bark cloth sandal
- 58 bark cloth loop with square knot



Summer-fall Microband Occupation 40

Actively Area A

Hunting and butchering

- 1 crude blade fragment
- 2 fine blade fragment
- 8 fine blade, pointed platform
- 9 fine blade, snapped, two edges retouched
- 10 fine blade, ground platform
- 9 thin-flake end scraper
- 10 crude, discoidal end scraper
- 16 thin, fine bilace
- 17 cul cane
- 21 Pelona
- 31 Texcoco
- 3R ramus, mandible, white-tailed deer
- 6A other, cottontail
- 60 femur, cottontail
- 9A fox
- 10A skunk
- 19A dog
- 23A iguana
- 31A hawk
- 32A turkey
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Plant collecting, harvesting and preparation

- 1 mortar fragment
- 3 tecomate mortar
- 18 muller or mano fragment
- 22 boulder trough melate
- 33 abrader hammerstone
- 1 overhand knot (lagave)
- 11 overhand knot in corn leaves
- 24 square knot with loop, in hard fiber strands
- 33 square knot without loop, in hard fiber strands
- 49 strands of hard fiber coil
- 50 ball of fiber or yarn, hard fiber
- 53 ball of fiber or yarn, cotton yarn, around leaves
- 55 loops of wound hard fiber
- 1 diodon eudle
- 4 grass quids
- 5 ze mays (maize)
- 6 acrocomia mexicana (coyol)
- 7 amaranthus spp.
- 8 persea americana (avocado)
- 9 acacia sericea pods
- 12 arachis hypogaea (peanut)
- 14 leucaena esculenta
- 20 prosopis juliflora seeds (mesquite)
- 22 casimiroa edulis (white bean)
- 26 cyrtocarpa procera (chupandilal)
- 27 spondias mombin (ciruela)
- 29 ceiba parvifolia roots (pochote)
- 30 ceiba parvifolia pods (tochote)

- 37 myrtillocactus geometrizans (garambuló)
- 38 opuntia spp. leaves (prickly pear)
- 39 opuntia spp. seeds (prickly pear)
- 40 opuntia spp. fruit (prickly pear)
- 43 sideroxylon cf. temisque (cosahuico)
- 44 diospyros digyna (black sapote)
- 45 capsicum annuum (chili pepper)
- 47 crescentia cujele (tree gourd)
- 48 unidentified cucurbita spp. (squashes and pumpkins)

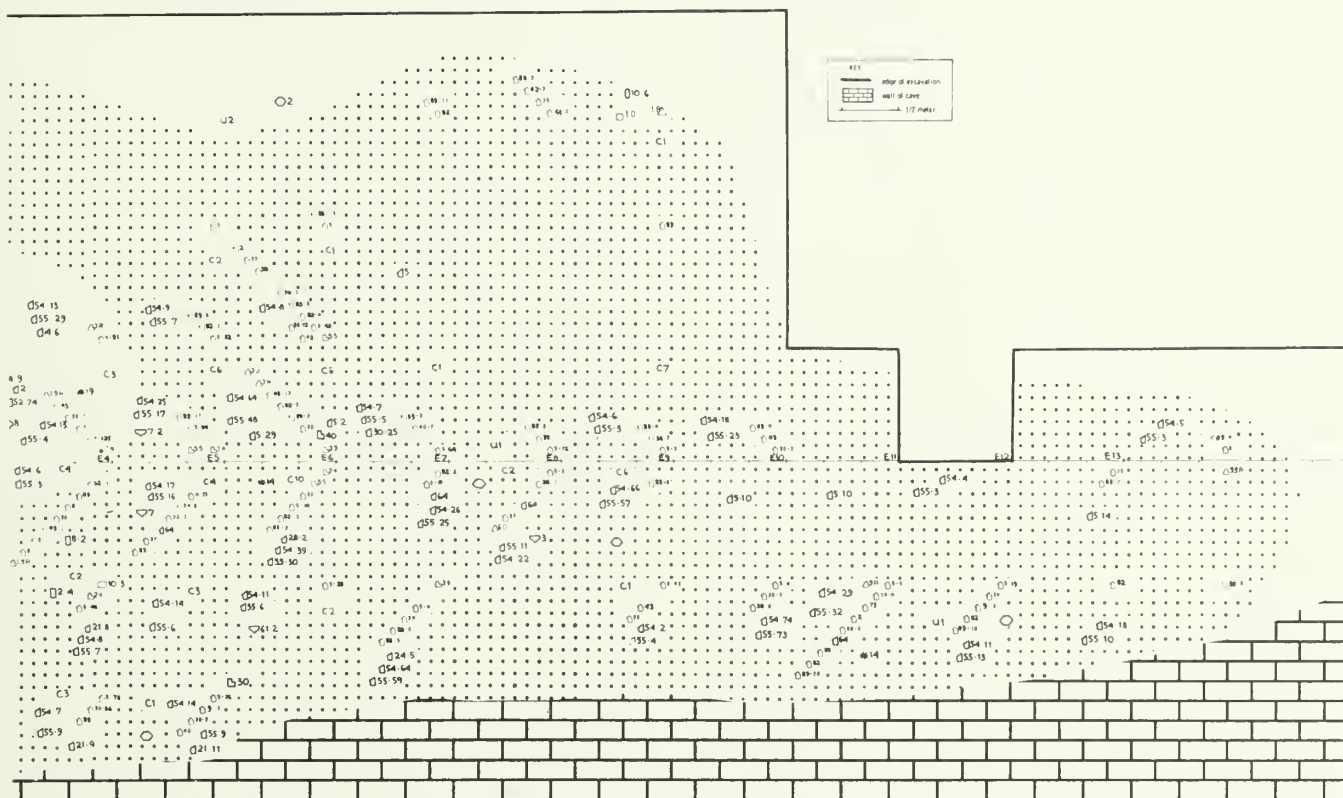
- 49 c. mixta
- 50 c. moschata
- 52 lagenaria siceraria (bottle gourd)
- 54 agave spp. quids
- 55 agave spp. leaves
- 56 agave spp. seeds
- 59 yucca periculosa seeds
- 63 tiffandisia spp. spikes
- 64 lillandsia dasyrhifolia
- 68 gossypium hirsutum (cotton)
- 70 grasses (unidentified)
- 75 leucaena pueblana pods
- 76 mimosa sp. pods
- 77 jatropa sp. seed
- 82 bark
- 83 wood

C number of sherds per square

Textile industry

- 5 large pointed stick
- 6 flat pointed stick
- 23 comb of tied sticks
- 32 carved paddle
- 2 split-bone awl
- 6 2-ply coarse cord, Z-twist (lagave)
- 14 cotton yarn, Z-twist
- 18 3-ply coarse cord, Z-twist (bast)
- 1 overhand knot, in bark strip
- 1 plain weave cloth
- 2 semi-basket weave cloth
- 3 basket weave cloth
- 4 warp-stripping cloth
- 6 twilled cotton cloth
- 7 gauze
- 35 twilled, coiled bundle foundation
- 50 bark cloth fragment
- 54 bark cloth sandals tied in pairs
- 57 bark cloth piece folded into rectangle
- 58 bark cloth loop with square knot
- 59 two pieces bark cloth tied with square knot
- 60 bark cloth handle for blade
- 10 fine blade, ground platform

Fig. 128. Activity areas of Zone II of Tc 50.



Spring-summer Microband Occupation 41

Activity Area B

- Hunting and butchering
 - 2 fine blade fragment
 - 8 line blade, pointed platform
 - 9 fine blade, snapped, two edges retouched
 - 10 fine blade, ground platform
 - 10 thin flake side scraper, one edge retouched
 - 10 crude, discoidal end scraper
 - 11 end-of-blade end scraper
- 18 Gariyito
- 31 Texcoco
- 31 tibia, white-tailed deer
- 3R ramus, mandible, white-tailed deer
- 60 lemur, cottontail
- 9A fox
- 16A opossum
- 19A dog
- 24A other lizards
- 32A turkey
- 33A other birds
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Plant collecting, harvesting and preparation

- 2 setaria cf. macrostachya
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 7 amaranthus spp.
- 8 persea americana (avocado)
- 9 acacia spp. pods
- 14 leucaena esculenta
- 21 prosopis juliflora quids (mesquite)
- 22 casimiroa edulis (white bean)
- 24 jatropa neopauciflora
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (ciruela)
- 28 condalia mexicana
- 29 ceiba parvifolia roots (pochote)
- 30 ceiba parvifolia pods (pochote)
- 8 cut or pierced gourd
- 14 slip knot
- 24 square knot with loop, in hard fiber strands
- 30 square knot with loop, in corn-leat string
- 33 square knot without loop, in hard fiber strands
- 40 granny knot, tying single loops
- 55 loops of wound hard fibers

- 37 myrtillocactus geometrizans (garambulo)
- 38 opuntia spp. leaves (prickly pear)
- 39 opuntia spp. seeds (prickly pear)
- 40 opuntia spp. fruit (prickly pear)
- 43 sideroxylon cf. temisque (cosahuico)
- 44 diospyros digyna (black sapote)
- 48 unidentified cucurbita spp. (squashes and pumpkins)
- 51 c. pepo
- 52 lagenaria siceraria (bottle gourd)
- 54 agave spp. quids
- 55 agave spp. leaves
- 64 tillandsia dasylirotolia
- 65 beaucarnea gracilis (isotolin)
- 67 cissus sp.
- 70 grasses (unidentified)
- 75 leucaena pueblana pods
- 79 zizyphus pendunculatus (cholulu)
- 82 bark
- 83 wood
- C number of sherds per square

Textile industry

- 62 discoidal bead
- 14 cotton yarn, Z-twist
- 19 corn-leat (huski) cord, Z-twist (basti)
- 3 basket weave cloth
- 7 gauze

Maize fragments were found throughout the entire area with the largest concentration from W2 to 0 and south of the S2 line (Fig. 128). Although these fragments represented several varieties, they were not as plentiful as in the previous Zone III. Four different varieties or races were represented in this zone, the most common being the Nal-Tel-Chapalote group which is represented by 601 cobs and cob fragments. The next most common is slender pop, represented by 596 cob fragments, and the third most common is late tripsacoid, represented by 365 cobs and cob fragments. Only one cob of early tripsacoid was found. Some kernels of corn were also found in this zone. MacNeish estimates that 73% of the food-getting activities of this zone were involved with domesticated plants.

Few animal bones were found in the deposits of Zone II. These were largely concentrated in the western half, west of the 0 line, Activity Area A. Another concentration is in the east, east of the Feature 5 area, Activity Area B. The bones indicated that two individual deer had been butchered at the site, as well as cottontail, fox, skunk, and dog. Some bird remains were found, including turkey, and a hawk-size bird. Intrusive rodents included two rats and two mice.

There was some evidence that these concentrations of artifacts and ecofacts could be divided into two different periods of time in the occupation of Zone II. The earliest, Occupation 40, concentrated largely in the western Activity Area A half, included the remains of Audubon cottontail rabbit, fragment of a dog mandible, and some vertebrae from the black iguana and the racerunner lizard. The suggestion from these faunal remains is that the zone was first occupied in the summer or the middle of the wet season. The upper half of the zone, and somewhat concentrated to the west, Activity Area A, included the remains of two deer, Mexican cottontail rabbit, gray fox, and hooded skunk, as well as turkey and hawk remains. The condition of these bones suggests the possibility of an August to October, or harvest-time occupation of the zone.

Many textile fragments were found in Activity Area A, largely concentrated in the W1 to W3 area and from S1 to S3. This is in the area of the largest concentration of plant remains, indicating that the preservation was perhaps best in this region close to the back wall of the shelter. Fragments of strings with knots in them were found in the same area. There were also more fragments of textiles, string, cotton, and bark cloth in the adjacent squares from W4 to W9 between S1 and

N1. Not only that, there were also a number of tools of wood, including polished stick, which may have been part of a loom, polished pointed sticks, possibly used as loom picks or needles, a weaving comb of sticks tied together, a tamping paddle or heddle, and two bone awls, which may have served as weaving sticks. Thus, it would seem that, during their planting and harvesting stay, some of their time was devoted to weaving. The thirteen pieces of textiles were woven by six different techniques: plain weave, semi-basket weave, basket weave, weft and warp cording, twilling, and gauze weaving, and would have employed as many different types of belt looms. Although this was a major endeavor, it is interesting to note that no bundles of raw cotton occurred, nor were there any spindle whorls for making the yarn, or cord used in the weaving. These activities must have been done in their permanent homes. Also, besides this weaving activity, bark cloth was also being made or utilized during their stay, for, again, there were many fragments of same in Activity Area A. Whether or not these fragments had some ceremonial significance was difficult to determine. In the eastern Activity Area B of the site, just east of the Feature 5 area, were strings and knot fragments as well as cloth fragments.

Stone artifacts were found largely in the western portions of Zone II, that is, in Area A. These included Pelona and Texcoco points, sherds, chips, fragments of manos, mortars, and a trough metate.

One major activity of the site during the later Occupation 41, in Area B, seems to have been in a circular or semi-circular region around Feature 5 where the greatest amount of preservation was in the southwest area of this feature concentration. This Activity Area B was probably occupied during middle spring to summer, continuing on into the harvest season.

Four coprolites were found in Zone II, all in Area B. As in the immediately preceding zones, these indicated that the food being eaten by these people was largely from wild plants. Their diet was made up of an organ cactus species (*Lemaireocereus*) as well as other cactus and some remains of beans and meat, all present in the coprolites, which showed no evidence of plant remains from this zone. Once again, we suggest that the people who were harvesting crops here were not eating their produce on the site.

There is a contradiction in the season of occupation at the site, suggested by the material in the coprolites and the other data. The coprolites from both Areas A and B suggest a late dry-season and an early wet-season occupation. Also, as previously mentioned, we have

suggestions from the animal bones found that there were possibly two different occupations of this zone, ranging from the middle dry season to the late wet season. It is possible that the coprolites represent an occupation (Occupation 41) in the latter part of the dry season and early in the wet season, when planting of the crops took place (Activity Area B), and that the corn plant remains and fruits represent an occupation (Occupation 40) in the latter part of the wet season or in the fall when the crops were harvested. This is perhaps confirmed by Earl Smith's analysis of the wild plant remains (Vol. 1 of this series, Chap. 12) which suggests both a late wet-season and an early dry-season occupation of the site. Kaplan's analysis of the bean remains (Vol. 1, Chap. 10) suggests the late wet and early dry season. Our opinion is that a combination of these, as was stated above, is probably true; that there was an Occupation No. 41 during the dry spring season for the planting of the crops, but that the major utilization of the Coxcatlan Rock Shelter had been in the latter part of the previous wet season, to harvest other crops at maturity.

Sherds are of middle Venta Salada times, and two radiocarbon determinations were A.D. 900 \pm 120 and A.D. 1300 \pm 100. These dates averaged A.D. 1100 \pm 78 (I-672, I-662) (*Radiocarbon* 11:91, 92).

The Way of Life of Zone I

Zone I, continuous across the top of the entire area of the site, was not an occupational zone in quite the same sense as were the previous zones because of the churned-up nature of the deposit. It was composed of goat dung over refuse; the goat dung varied from 2 or 3 to 10 centimeters in thickness in various areas and formed a seal over the site, stopping erosion of the zones below it. Most of the original floor, which we have numbered Floor 28, was destroyed by the goats. Although the dung itself obviously was the result of activities since Colonial times (when goats were introduced into the area), the zone must have been occupied prior to that. The artifacts present, none of which were of the contact period, represented a cultural deposition of materials (final Occupation 42). Unfortunately, there were no pits that could be attributed to this terminal occupation because of the churned-up nature of the deposit. Although distinctively different from the other zones in its structure and the nature of its deposition, Zone I is treated as an occupation on the basis of its pre-Colonial artifacts.

Most of the remains recovered from Zone I were of plants that included both domesticated and wild varie-

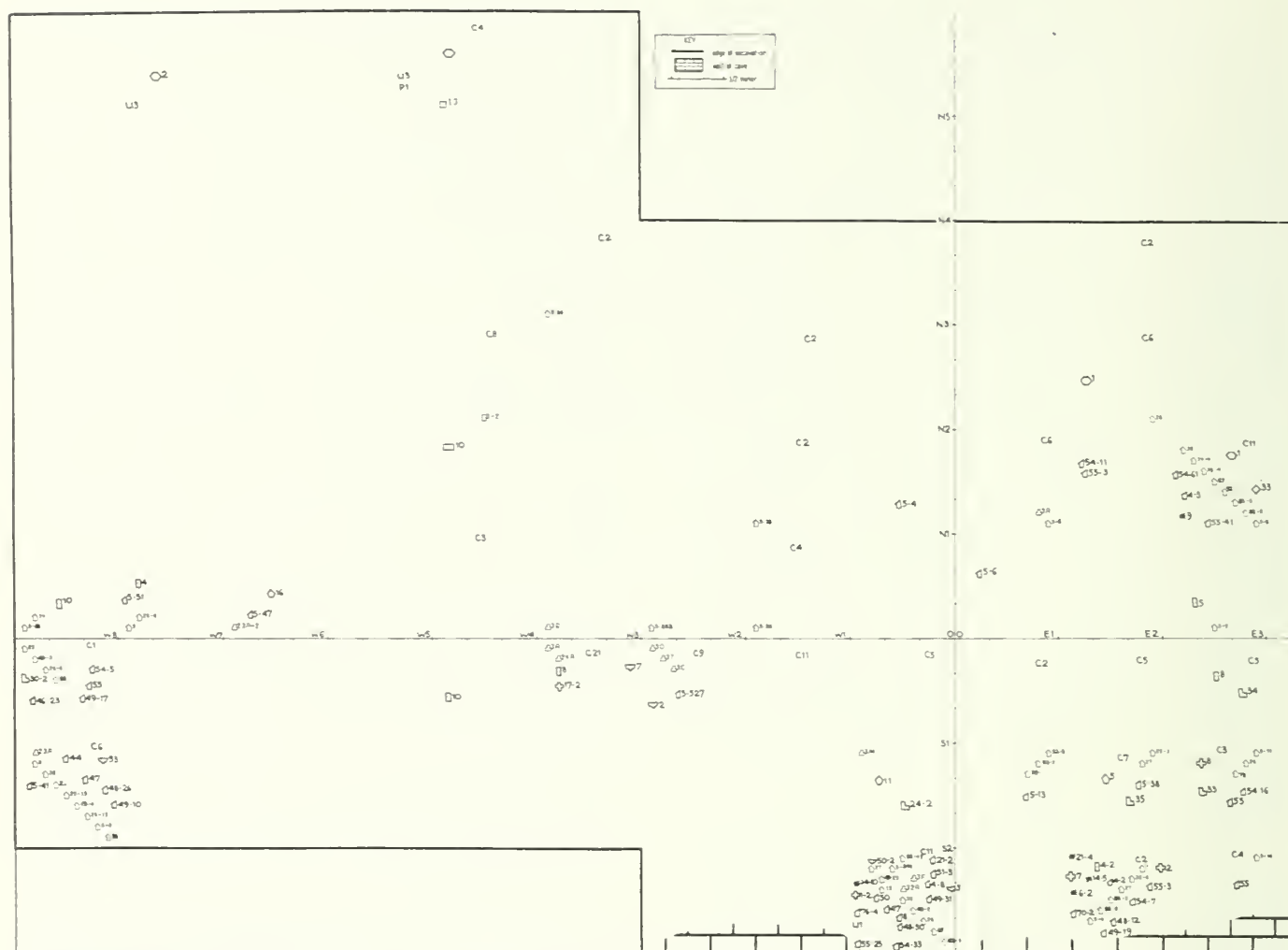
ties. Although the goat dung extended over the entire area, the archaeological concentrations of materials were largely in a central portion of the site from W1 eastward to E9 and extending northward to N2 and southward to the rock wall (Fig. 129). There was one concentration of preserved plant remains in the southwesternmost corner of the excavation from S2 to N1 between W7 and W9. Some faunal remains were found in this same area as well, but no artifacts. The plant remains included many of the species that had been present in earlier zones.

MacNeish estimated that 83 percent of the diet (or of the food-getting activities) came from domesticated foods, whereas only 5 percent came from wild foods. Still the most common varieties of maize found in this zone were the Nal-Tel-Chapalote group, which numbered 648 cobs and cob fragments. Again, late tripsacoid was the second most common, followed by slender pop and early tripsacoid. Four kernels of Conico were found in this zone. Once again, the major part of the remains of corn in this zone were the cobs, with very few kernels of corn being found. The corn was shelled at the site and the resulting seeds were taken away from the cave to the central locality of the harvesters.

The animal bones found represent the remains of one adult deer, probably a pregnant doe, as well as the remains of either a fetus or a tiny fawn. There were also remains of opossum and a small gopher and some dog remains. Fragments of bone representing one individual black iguana, one racerunner, and one adult turkey were also found. Some indications of intrusive rodents were present as well. The lizard remains were concentrated in the western portion of the site, particularly in the southwestern area where, as mentioned previously, we found the concentration of plant remains. The deer were largely concentrated from 0 to W4 and from N2 southward to the rock shelter wall.

The only artifacts recovered were some blade fragments, end-scraper fragments, and remains of textiles and knots. One of the textile fragments appeared to have been a mat, which may have been used for sleeping.

The distribution of materials in the central portions of the floor suggests that this was where the major activities of the site were carried out. There was not enough evidence, however, to indicate distinct activity areas other than this general region. This is undoubtedly due to the fact that the floor of Zone I was disturbed. Although Zone I was not, in the sense of the other floors, a normal habitation floor, it followed the pattern



Summer-fall Macroband Occupation 42

Hunting and butchering

- 3 crude blade, unprepared platform
- 4 crude blade, prepared platform
- 5 crude blade, pointed platform
- 8 fine blade, pointed platform
- 10 crude, discoidal end scraper
- 13 fine, ovoid, plano-convex end scraper
- 10 thin flake side scraper, one edge retouched
- 5 spherical battered pebble
- 17 cut cane
- 34 foetus, white-tailed deer
- 30 rib, white-tailed deer
- 36 metapodial, white-tailed deer
- 30 humerus, white-tailed deer
- 30 petrous bone
- 16A opossum
- 18A gopher
- 19A dog
- 23A iguana
- 24A other lizards
- 32A turkey
- cores
- U number of flakes without platforms per square
- P number of flakes with platforms per square

Plant collecting, harvesting and preparation

- 33 rectangular tripod metate
- 8 cut or pierced gourd
- 24 square knot with loop in hard fiber strands
- 30 square knot with loop in 2-ply, Z-twist corn-leaf string
- 33 square knot without loop in hard fiber strands
- 34 square knot without loop, in bark strands
- 35 square knot without loop, in corn leaves
- 37 square knot without loop, in grass stalks
- 2 setaria cf. macrostachya
- 4 grass quids
- 5 zea mays (maize)
- 6 acrocomia mexicana (coyol)
- 6 persea americana (avocado)
- 9 acacia spp. pods
- 12 arachis hypogaea (peanut)
- 14 eucalyptus esculenta
- 20 prosopis juliflora seeds (mesquite)
- 21 prosopis juliflora quids (mesquite)
- 22 casimiroa edulis (white bean)
- 24 jatropha neopauliflora
- 26 cyrtocarpa procera (chupandilla)
- 27 spondias mombin (curatela)

- 30 ceiba parvifolia pods (pochote)
- 38 opuntia spp. leaves (prickly pear)
- 40 opuntia spp. fruit (prickly pear)
- 43 sideroxylon cf. tempisque (cosahuico)
- 44 diospyros digyna (black sapote)
- 47 crescentia cujete (tree gourd)
- 48 unidentified cucurbita spp. (squashes and pumpkins)
- 49 c. mixta
- 50 c. moschata
- 51 c. pepo
- 52 lagenaria siceraria (bottle gourd)
- 54 agave spp. quids
- 55 agave spp. leaves
- 61 hechtia sp.
- 65 beaucarnea gracilis (sotolin)
- 67 cissus sp.
- 70 grasses (unidentified)
- 75 leucaena pueblana pods
- 76 mimosa sp. pods
- 78 zizyphus pendunculatus (cholulu)
- 82 bark
- 83 wood
- C number of sherds per square

Textile industry

- 49 strands of hard fiber coil
- 6 2-ply coarse cord, Z-twist, fine hard (agave) fiber
- 7 2-ply coarse cord, Z-twist, thick hard (agave) fiber
- 9 2-ply coarse cord, S-twist (bast)
- 14 cotton yarn, Z-twist
- 21 cotton cord, 2-ply, S-twist
- 2 semi-basket weave cloth
- 3 basket weave cloth
- 7 gauze
- 50 bark cloth fragment
- 61 sandal
- 1 polished stick
- 2 cut stick
- 7 spine pin

Fig. 129. Activity area of Zone I of Tc 50, with a key to its artifacts and ecofacts.

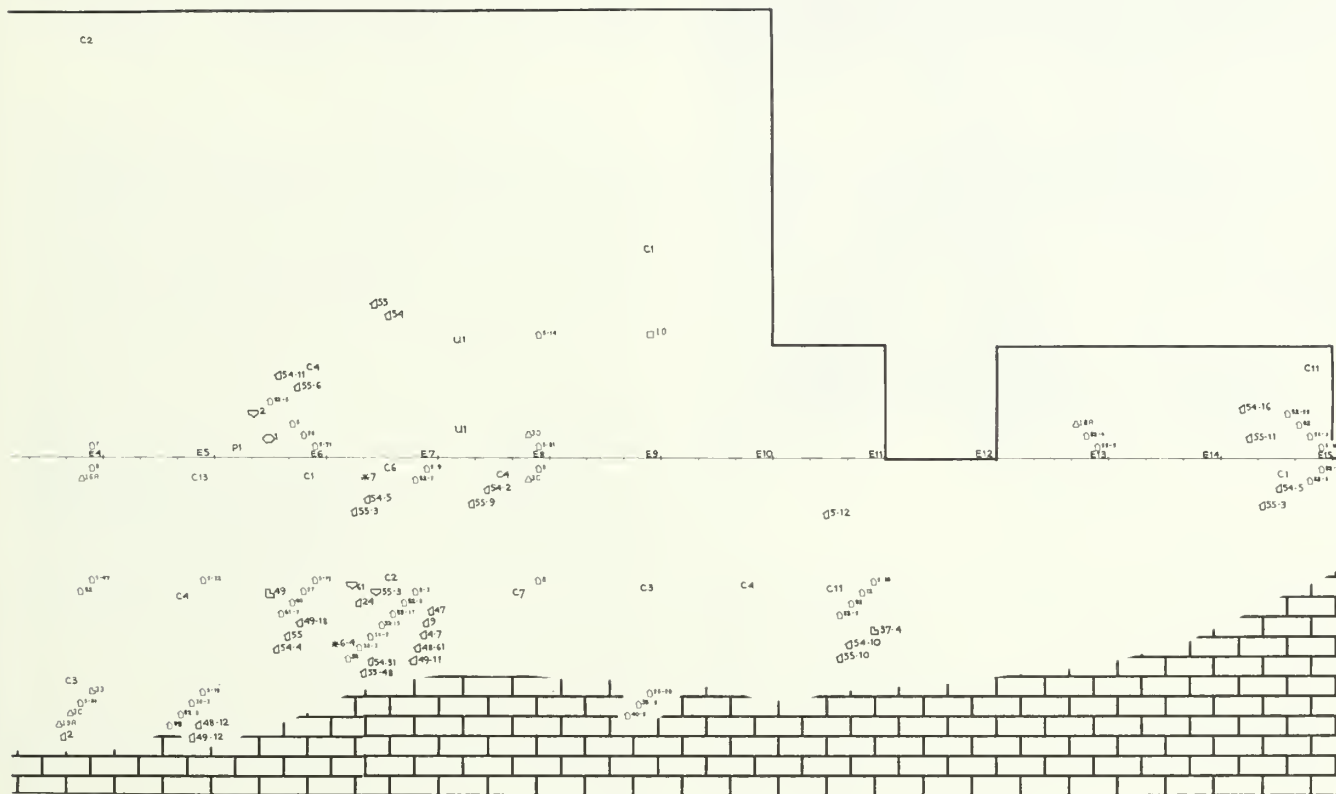




Fig. 130. The west-east trench in Ts 51, looking east along the terrace of Coxcatlan Cave.

of the other Palo Blanco and Venta Salada floors beneath it in that it appeared to be largely a harvesting station. The rejected or discarded remains of various plant foods, largely domesticated, indicated that the harvest took place in the vicinity, the plants were processed there, and the food portions carried to the central community out of which this farming camp operated. This was indicated not only by the abundance of corn cobs with very few kernel or seed remains, but also by the animal remains that were largely of foot or lower leg bones, indicating that the animals were butchered at the site.

Only one coprolite came from this zone. Analysis indicated the foods were largely those of wild grasses, pochote, and maguey (the dominant material in this coprolite), confirming the fact that the people were not eating the domesticates here at the site but rather were eating only wild foods, taking the food products from their domesticated plants off to another location.

Flannery suggested a late wet-season occupation, which would fit in with the harvest season analysis of this zone. The plant remains suggested an occupation from early dry through the wet season, and the coprolite material suggested perhaps either the end of the wet season, or the beginning of the dry season. So,

once again, we have an indication of people using the site during the planting season, with the predominant use in the late wet season and the very beginning of the dry season when the harvesting of the domesticated crops took place.

The dating of this zone is, of course, very tenuous, but we feel the artifacts represent the immediate pre-contact period, and we suggest an age for Zone I of approximately 1300 to 1500 A.D.

The Coxcatlan Terrace Site

Almost from the outset of our Tc 50 excavations we were well aware that there was open site at the foot of the talus to the north, for we had noted various burned areas and occasional artifacts in the banks where the arroyo had cut into the narrow terrace. So, in 1961, the junior author dug a small 3-meter trench in Ts 51, and, at about a 1-meter depth, discovered abundant artifacts of El Riego type in 2 well-defined strata, Zones E and D, as well as Abejas ones in an overlying Zone C. Here was a chance to obtain a good sample of El Riego and Abejas Phase artifacts from an open site, or at least from 3 open components, to supplement the information we were by then getting from our stratified components in caves and from survey.

Due to a whole set of prior commitments, we did not get an opportunity to excavate Ts 51 until the spring of 1962, and then the senior author took over the field operations. In addition to the small 3-meter Trench A (N20E1-N23E1), three other trenches were dug into the vertical bank from the arroyo, Trench B at N22W9, Trench C at N21W1, and Trench D at N21E19 to N23E19, and we were able to strip off the exact stratum, square by square, as we dug southward. A study of the artifacts and the profiles of the four trenches revealed that the easternmost Trench D had the clearest stratigraphy and the most artifacts.

Therefore, we decided to run a long 1-meter-wide trench east from Trench D. (See Fig. 93.) Initially we dug west from Trench D removing Squares N21E15 and N21E17 by stripping strata from a vertical face, but to the east we dug more or less in alternate squares by stripping off horizontal strata from the surface downward. Alternating squares from N21E22 to N21E40 were removed in such a manner. Square descriptions were kept for each of the strata, and the materials were bagged accordingly. A north-south 1-meter-wide profile was drawn for each square. After this operation the standing squares could be removed by stripping off horizontal strata from the 1 or 2 vertical profiles. Thus, we removed the in-between squares N21E21

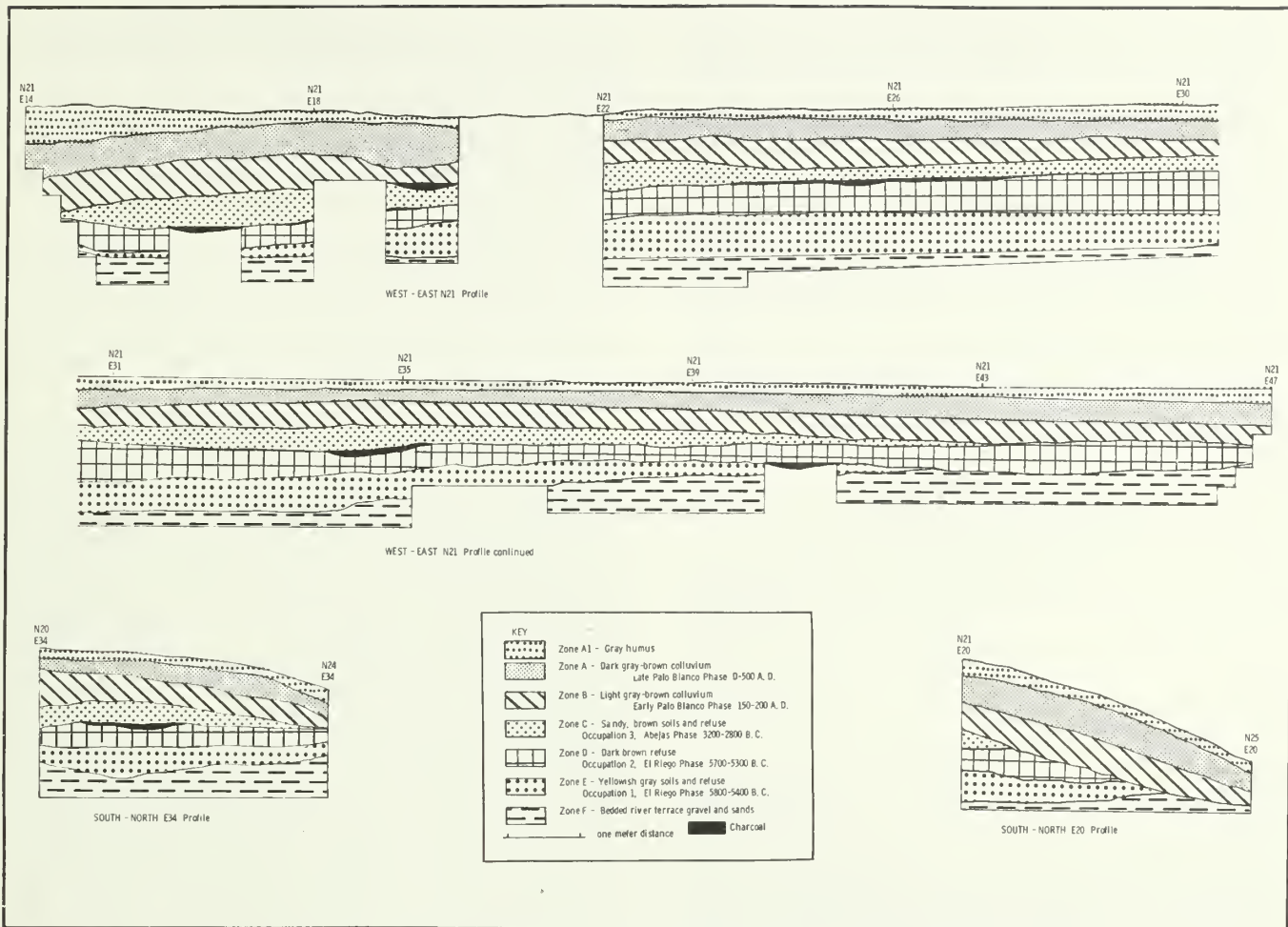


Fig. 131. The west-east N21 profile (top) and south-north E34 and E20 profiles of Ts 51.

through N21E39, as well as N21E41, square descriptions were kept, and the materials sacked by stratum. Also, since this completed our 1-meter-wide and 28-meter-long trench, we could now draw the profiles from N21E15 to N21E41 as well as from N22E15 to N22E41 (Fig. 131).

Our final endeavors at the site were more in the line of a mopping-up operation as we excavated only a few more squares. Because our easternmost Square N21E41 was east of what seemed to be the major part of the occupation, we decided to sink one more test at N21E46 to make sure that we really had reached the limit of the components. It seemed Zones C, D, and E were indistinguishable, and artifacts were absent in the easternmost test. We also dug 2 squares, N21W1 and N22W9, west of Trench A to see if we had delimited the western edge of the occupation. Results

were not very clear, although there were a few artifacts. Also, at about N21E31, there were burned hearth areas, so we dug a few more squares (N20E32, N22E32, N23E32) to better define these features. There was another burned area in the profile at about N21E39.5, so we dug Square N20E40 to better define it.

While our excavations were not extensive enough to allow for adequate contextual interpretations, they did provide good stratigraphy and confirmed that of Coxcatlan Cave. The upper 2 strata, Zones A and B, were obviously washed in from the deposits of the cave and had mostly Early Palo Blanco remains, mixed with both earlier and later materials, and could not, therefore, reveal much about the way of life of any single occupation during that period. Zone C, just beneath, however, did seem to have had a definite occupation,

No. 3, of early to middle Abejas times. A sandy, clayish refuse deposit with a small burned area on its top, it overlay Zone D, a thicker, dark brown stratum with a number of hearths on it. Zone D also seems to have held one or more occupations, No. 2, these of late El Riego. It overlay a yellow-gray stratum, Zone E, that blended into the top terrace gravels of Zone F. The artifacts indicated it, too, was laid down during late El Riego times and was very similar in content to Zone D, sufficiently so that, in our chronology charts in previous volumes, the artifacts of the two zones were lumped together. Whether Occupation 1 was a single occupation or a number of occupations is difficult to discern. Table 13 outlines the stratigraphy.

T A B L E 13
Sequence at Ts 51

<i>Palo Blanco Phase</i>		
	Zone A	0-500 A.D.
	Zone B	150 B.C.-200 A.D.
<i>Abejas Phase</i>		
Occupation 3	Zone C	3200-2800 B.C.
<i>El Riego Phase</i>		
Occupation 2	Zone D	5700-5300 B.C.
Occupation 1	Zone E	5800-5400 B.C.

The area of excavation was not extensive, and we did not plot the artifacts on floor plans for we felt they would not show definable clusters. We have, however, attempted to describe the way of life on each floor, and, in doing so, we shall mention some possible activity areas. As we shall show, life in this open site was apparently little different from life in Coxcatlan Cave nearby.

The Way of Life of Zone E

Overlying the yellow, stratified sands and gravel of the terrace was a yellowish-gray stratum about 20 cm. thick, Zone E. It was visible in the erosional cut of the arroyo from about W10 to our test at W3. It also appeared in the profile from our trench at N23E1 to N21E1 to where it began to thin out at about N21E39, a total distance of about 40 meters. Since our test ran west to east with only a few small entrances from the arroyo to the north, we could not determine the north-south dimension of Zone E. Further, the present arroyo cutting must have removed part of it. It was at least 10 meters wide, but it may originally have been as wide as 30 meters. Plotting artifacts from our 1-meter-

wide trench revealed 4 concentrations. However, there were no features in the stratum, and, without seasonal indicators in the artifact concentrations, it was difficult to determine whether they represented 4 encampments at 4 different times, or 4 groups of people living side by side at one period, or any combination thereof. Be that as it may, the concentrations were fairly evenly spaced. They contained roughly the same artifact complexes indicating similar activities, so we suspect the zone was a single occupation (Occupation 1). If so, it would have been a macroband seasonal camp, and, furthermore, seed grinding tools suggested a wet-season occupation.

The first activity area was in the bottom of the cross-trench in Squares N23E1 and N24E1. Remains of 2 deer and a Trinidad point indicated the people were involved in hunting, and the blades, ovoid bifaces, and side-scraper suggested some butchering. A mortar and a scraper-plane further suggested the preparing of seeds; perhaps the occupation occurred in the spring when seeds ripen. The gouge, end-scraper, hammerstone, and 23 flakes may mean they also worked wood, scraped skins, and chipped flint.

The second area was uncovered from N21E12 to N21E16 to N22E16, where, although we found no bones, we did find 6 projectile points—a Lerma, 2 Abasolo, a Hidalgo, a Trinidad, and a La Mina—showing they did hunt. There was no evidence of any butchering. Many scrapers and a gouge occurred, suggesting that they worked skins and/or wood. Two hammerstones, chips, and scraper-planes, along with a chopper which could have been a core, showed they also did flint knapping.

The third area was close to the second, and ran from N21E19 to about N21E23. It was much the same in terms of possible activities. Deer bones occurred with a Hidalgo, a La Mina, and 2 Trinidad points, as well as bifacial knives, a blade, and side-scrapers that could have been meat knives. Besides evidence of hunting and butchering, there were milling stones and a domed and a flat-topped scraper-plane which suggested plant collecting and processing. There were also 2 spokeshaves that could have been used in wood-working.

There was a dearth of artifacts in the next 3 meters of our trench until about N21E26; then a concentration occurred that continued to about N21E34, which we named Activity Area 4. Here we found no projectile points, but there were some scraps of deer bones, fragments of a milling stone, and a large number of scraper-planes. In spite of the absence of points, we may

infer from the artifacts that the subsistence activities here were much like those in the other 3 activity areas. There were more end-scrapers and graters, indicating skin-working, and the gouges and spokeshaves may be evidence of woodworking. The 2 hammerstones, cores, and chips show that they too were flint knapping.

Although the occupation may have lasted a shorter time, and of a different season, the general pattern of activities and the artifact types show Zone E of Ts 51 to be much like the western occupation of Zone XVI of nearby Coxcatlan Cave. This suggests that Zone E was occupied sometime between 5800 and 5400 B.C.

The Way of Life of Zone D

Zone D, unlike Zone E, was a definite floor made up mainly of a dark charcoal stratum. It contained a burned patch and 2 fire pits. Study of the profiles and the river bank showed that the floor extended about 70 meters east and west, but the north-south limits are unknown. If all its activity areas were contemporaneous, it, too, would be classified as a macroband encampment. The mortars and pestles found in it may mean the occupation occurred in the spring when these tools could have been used for pounding seeds.

While there was a small concentration of artifacts, including many choppers and scraper-planes, in our westernmost Square N23E1, the first well-defined activity area occurred from N21E12 to N21E16, more or less around the burned area at N21E15 and on top of Area 2 of Zone E. In this area were deer bones and 3 Abasolo and a Trinidad point, as well as some side-scrapers and blades, indicating the group hunted and then butchered their kill. Many scraper-planes and 2 parts of flaring-rim mortars also suggested some plant and seed preparation and chips, hammer, end-scrapers, and gouge suggested flint knapping, skin preparation, and woodworking, respectively.

The next concentration, Area 2, had many more artifacts. It extended from N21E19 or 20 to about N21E29 with a small fire pit in Square N21E27. Right around this fireplace the concentration of artifacts was the heaviest and there was also the greatest number of chips and cores, associated with 3 hammerstones. It obviously was a flint-knapping area; also occurring were 2 Hidalgo, 2 Trinidad, a Lerma point, and some broken point fragments. Blades, end-scrapers, and side-scrapers were also found in Area 2. Butchering and preparation of the skin of hunted game occurred here. A few scraper-planes, a mortar fragment, muller and milling stone fragments were also uncovered. A majority of the grinding or pounding tools, including

stone bowls, conical and cylindrical pestles, and some other artifacts, appeared just west of the hearth where evidently they prepared seeds. Also, in this latter area, were a number of gouges, spokeshaves, and graters, suggesting woodworking.

The final group of artifacts were more randomly distributed through the east part of our trench, although there was a slight concentration (10 artifacts) near a shallow hearth in Square N21E35. Only 1 mortar fragment and no projectile points occurred in this area; and chips and cores were rare. There were, however, many side-scrapers, spokeshaves, some blades, and scraper-plane fragments, as well as a few end-scrapers, a hammerstone, and flake choppers. Perhaps woodworking, butchering, or skin preparation were engaged in here.

Regardless of whether or not all the areas and the various inferred activities were contemporaneous, the zone as a whole had many artifacts that justified considering it an El Riego component. The percentages of these artifacts indicated a late part of the phase, perhaps between 5700 and 5300 B.C.

The Way of Life of Zone C

The overlying Zone C was a 20-cm.-thick stratum of sandy brown soils with few if any definite evidences of floor-like areas or hearths on it. However, a single burned area at its surface in Squares N21E15 to N22E15 did suggest that some of the artifacts were deposited by people when they were actually living on it. It might be added that in the burned area was the only concentration of artifacts (9 or 10) for the whole zone. The rest of the limited artifacts and chips were sprinkled throughout the zone from N23E1 to N21E32 with only a single deer bone in N23E1. Whether it was a macroband, or a microband, or a series of microband occupations is difficult to determine, but we would guess it was the former, and have numbered it Occupation 3. The boulder metate, bowl fragment, and ovoid mano suggest it was occupied in the spring. These grinding tools came mainly from the burned area where they were associated with a chopper, a scraper-plane, 2 crude, discoidal end-scrapers, 3 thin side-scrapers, and a point fragment. In Squares N21E32, N21E33, and N21E34 were 41 flakes, 5 cores, 2 scraper-plane fragments, and a domed scraper-plane fragment, all of which could have been cores, a thin biface fragment which could have been a preform, 2 side-scrapers, and an incomplete Garyito point. Perhaps this was where flint knapping was practiced. Other artifacts including gouges, choppers, end- and side-scrapers, a fine blade, and point fragments, as well



Fig. 132. Contour map of Tr 65, showing mounds and house features.

as 2 Coxcatlan points, occurred at random in the zone. Perhaps hunting, woodworking, butchering and skin-scraping activities were pursued during this occupation, but there were no artifact clusters to indicate it. The artifacts did allow us, however, to consider Zone C an Abejas component, roughly in the period from 3200 to 2800 B.C.

Zones A and B

Zones A and B were of colluvium that had washed down from the cave area and covered the earlier occupations. Zone B was light gray-brown in color and varied in thickness from 40 cm. to 60 cm. Included in the deposits were a few flakes, a skunk parietal bone, a side-scraper, and a number of sherds of the Early Palo Blanco Phase.

Zone A was little different from the underlying Zone B, being slightly darker in color near the surface (Zone A1) and varying between 20 and 50 cm. in thickness. It contained flakes, a deer mandible, 2 side-scrapers, and more sherds, mainly of Palo Blanco times; there were also 10 Thin Orange sherds and 4 Coxcatlan

Brushed sherds, so Zone A could have been of Venta Salada times. Perhaps this latter deposit was washed onto the underlying Zone B during that period.

The Coxcatlan Road Site

During construction of the road into Coxcatlan Cave from Pueblo Nuevo in 1961, a large site, Tr 65, with abundant Venta Salada remains was discovered 1.7 kilometers northwest of the cave. We had many workers on hand from road-building; and, because we were not yet ready to make use of them in the cave excavation, Fred Peterson was allowed to employ the workers for a test in Tr 65. It would appear from the meager notes, reinforced by only fading memories, that he had dug a 1-by-6-meter trench, roughly east and west, along the south edge of a structure, later to be called Structure No. 162. The trench was dug in 3 or 4 arbitrary 20-cm. levels and yielded abundant artifacts, as well as Late Venta Salada sherds, a very high proportion of which were Striated Buff, a type used in making mold-made pottery. Only decorated sherds were saved for analysis. In 1961 the excavations were such

that there was very little we could say then about the life of the ancient inhabitants.

Fortunately, we were able to map and re-excavate this site during the 1971-73 seasons under the direction of Edward B. Sisson, and much new information should be forthcoming. These materials from these more recent excavations have not yet been analyzed so we must await his final reports; meanwhile, in an attempt to bring our Coxcatlan report up to date, we shall re-publish his comments below, map (Fig. 132), and drawings of house features (Figs. 133-136) without comment (Sisson, 1973, pp. 24-56).

"... The site probably continued to be occupied in the early Colonial period, even though objects of obvious Colonial manufacture have not been recovered. Given the situation in rural areas of the Valley of Mexico during the 16th and early 17th centuries as described by Charlton (1968; 1970), the apparent 'absence' of objects of Colonial manufacture from sites in the Tehuacan Valley is not surprising. The location of site Tr 65 corresponds quite closely with the location of San Mateo Tlacuchcalco as indicated on the map accompanying the 1580 'Relacion Geografica' of Coxcatlan (Sisson, 1973, Fig. 2). Today, San Mateo Tlacuchcalco is located across the valley seventeen kilometers from site Tr 65.

"The site lies within the eastern alluvial slope or thorn forest ecological zone. This zone is characterized by a highly dissected topography and an abundance of flora and fauna. Local rainfall is not sufficient to support the abundant plant life. These plants can only survive because of the seasonal flow of water in arroyos originating in the mountains to the east. The flow of water in these arroyos was probably greater and more steady before the pine-oak forest on the mountain slopes was so severely cut over for construction material and firewood. The plants which abound include mesquite, pochote, palo verde, various types of cactus, and fruit trees such as the chupandilla and cosahuico. The fauna is represented by deer, peccary, coyote, opossum, raccoon, skunk, rabbit, iguana, lizard, rats, mice, and numerous birds.

"On the north, the site is bounded by barranca of the Rio Zapote: the Cerro Colorado de Pueblo Nuevo is the southern limit of the site; and the Arroyo Coxcatlan is its eastern boundary. On the west, there is no natural boundary. Today, irrigated fields belonging to the ejido of Coxcatlan lie in this direction. The site covers approximately 60 hectares (148 acres) with a maximum north-south dimension of one kilometer and a maximum east-west dimension of 600 meters. Not all of

this area was occupied. 157 of the 175 structures recorded in our 1971 survey of the site [Fig. 132] are concentrated on four ridges trending northeast-southwest. These ridges are separated by small seasonal arroyos which empty into the Rio Zapote. Once the map of the site had been completed, each structure recorded was systematically surface collected.

"The four ridges were numbered consecutively from north to south for ease of reference. On ridge one, the northernmost ridge, our survey recorded thirty-five structures clustered in aggregates averaging six structures apiece. Upon examining the completed map of the site, we realized several of the structures assigned separate numbers in the field were actually parts of much larger structures consisting of various units. Excavations during the 1971 and 1972 seasons confirmed this observation. In part, this confusion reflects the difficulty of mapping with a Brunton compass in the thorn forest environmental zone.

"Frederick Peterson had made a series of test excavations on this ridge. His collections contained an unusually high percentage of Coxcatlan Striated Buff pottery. This type consists of convex molds for the manufacture of 'cajetes' and 'molcajetes.' The analysis of our surface collections from the site revealed that 95.3 percent of the Coxcatlan Striated Buff sherds were found around five structures on ridge one; 81.2 percent came from around two contiguous structures near which Peterson had excavated. The high percentage of Coxcatlan Striated Buff from around these five structures suggested that perhaps we were dealing with a 'barrio' of pottery makers. One of these structures (162) was selected for excavation by Deborah Scheraga. Seven working days at the end of the 1971 season were devoted to the excavation of this structure. Although there was not enough time to completely excavate the structure, the material recovered did support our original impression that it was a pottery production area.

"Outside the north wall of the structure there was a thick layer of ceramic refuse. A high percentage of this ceramic refuse was molds for making 'cajetes' and 'molcajetes.' In addition, the refuse yielded a number of molds for manufacturing the faces of 'xantiles.' (The 'xantil' is a god effigy censer with a mold-made face and a hand-modeled body.) The 'cajete' and 'molcajete' sherds from the refuse have an unusually large number of firing defects and may represent rejects. A small grinding stone and a polishing stone were also recovered from the refuse. The polishing stone could have been used for smoothing the surface of a vessel after it

was removed from a convex mold. Still adhering to the working face of the vesicular grinding stone were traces of red paint. The color of the paint is similar to the color of the red slip applied to the surface of Coxcatlan Brushed and Coxcatlan Red vessels.

"Within the structure, a series of Coxcatlan Brushed 'cajetes' and 'molcajetes' and Coxcatlan Striated Buff molds were found arranged around what was probably a work area open to the sky. We believe that it was an open area because associated with it were drains presumably for carrying off rain water. The 'cajetes' and molds were placed in pairs, one inverted atop the other, around the area. The stucco floor at this point was not deeply buried and had been badly damaged by roots. It was, therefore, difficult to determine the exact relationship between the vessels and the stucco floor. Some vessels seemed to rest on the floor; others appeared to be above the floor; and some appeared to be beneath the level of the floor. We believe this to have been a work area and the 'cajetes' and molds to have been stored around the edge of the area until they were needed. Pairs of vessels, one inverted over the other, are also common as dedicatory (?) caches beneath the floors of rooms and in platform walls.

"In this same open area, there were two stucco-lined pits with vertical walls sunk beneath the level of the floor. Similar stucco-lined pits have been found in several of our other excavations. Because they are so common, we believe that their primary function was water storage. They may have also been used as basins in which clay was prepared for molding. Water for mixing with the clay could have been kept in one of two large ollas found on the floor nearby. A large 'cantaro' placed with its body beneath the floor so that only the neck protruded above the floor, may have also held water for mixing with the clay.

"A third, bell-shaped stucco-lined pit was discovered in the fill of the platform wall adjacent to the above mentioned work area. Within this pit there was an adult buried in a flexed position. The only offering with this burial was a large polishing stone made from an unidentified fine-grained, black stone. Although it is fairly large, this stone could have been used to smooth the surface of vessels. Fine striations on the face of the polishing stone may have resulted from the smoothing of a clay surface with protruding temper particles. The only implements and materials necessary for a potter and missing from the inventory of structure 162 are a kiln, a supply of tempering material, and a supply of clay. The clay and tempering material are both available locally.

"Scheraga resumed excavation at structure 162 early

in the 1972 field season. Three weeks were devoted to expanding the 1971 excavation. Subsequently, Scheraga spent almost two months analyzing the material recovered. This analysis will be the basis for an M.A. thesis at Brandeis University. A final report on this research should be available early in 1973. The goal of the thesis will be to examine the technological, social, and economic aspects of pottery production at site Tr 65.

"Excavation during the 1972 season exposed several rooms arranged around an open patio just east and southeast of the pottery workshop. Several rooms arranged around the sides of an open patio is emerging as the most common household plan at Tr 65. The work area, a raised platform, abuts the patio on the west. Fragments of manos and 4 spindle whorls from the room excavations suggest that domestic functions were also being performed in structure 162. The picture that is beginning to emerge is that of a cottage industry. Each potter, in a neighborhood of potters, worked within his own home. The potter or potters living in structure 162 seem to have specialized in 'cajetes,' 'molcajetes,' and 'cantaros' of the type Coxcatlan Brushed. They were also making 'xantiles,' but were not making such decorated wares as Coxcatlan Polychrome, Coxcatlan Red-on-Cream, Coxcatlan Black-on-Orange, and Coxcatlan Red-on-Orange. No kiln or open firing area has been found. This is not surprising, however, since most of the excavation has been within the structure.

"The tendency for structures on ridge one to cluster and the strong indications that one cluster was devoted to pottery-making suggested to us the possibility that the residents of each cluster were craft specialists and that each cluster was devoted to a different craft specialty. Preliminary analysis seemed to indicate an unusually large number of obsidian blades around structure 153. Could the residents of structure 153 and the other nearby structures have been obsidian knappers or engaged in an activity requiring a large number of obsidian blades? Near the end of the 1971 season, Pat Stein undertook the excavation of structure 153 in an attempt to answer this question. Stein's excavation revealed an 'L'-shaped stone platform. The arms of the platform are 6.5 meters and 5.5 meters long and average 2.3 meters in width. A second small stone platform was found adjacent to and northwest of the first.

"Because of their small size, it is very unlikely that these platforms ever served as bases for houses. They may have been the base for an outbuilding of perishable material. At one time, I thought that they might have only been retaining walls for a small plaza in

front of the much larger structure 152 to the east. Stein vigorously disagreed, and I now believe that she is correct. The cultural material recovered is not consistent with the obsidian knapping idea. The most distinctive thing about the 'L'-shaped structure was the large number of mold-made spindle whorls found. The decoration and the bitumen painting on these whorls point to a Gulf Coast origin. At the end of the 1971 season, there were almost as many mold-made spindle whorls from this single structure (8) as there were from all of the other structures at the site taken together (10). During the four years of the Tehuacan Archaeological-Botanical Project, only 46 mold-made spindle whorls were recovered (MacNeish, Flannery, and Peterson, 1970:15). Could structure 153 and the other structures of its cluster have been a neighborhood of spinning and weaving specialists? Last year, I would have answered yes. After the excavation of structures 152 and 10 during the 1972 season, I think not.

"Structure 153 was probably an outbuilding used by the residents of structure 152/10 for a variety of purposes including spinning and weaving. Today, around Zoquitlan, women still weave 'cotones' on backstrap looms. Because their houses are too small and crowded, the women work outdoors. Inclement weather slows production greatly. Although the Tehuacan Valley is less likely to experience prolonged rainy spells, a roof over the weaving area would protect the work from the occasional bad weather and the heat of the noon-day sun.

"Less than 10 meters east of structure 153 is structure 152/10. As Figure [132] illustrates, in our original survey structures 152, 10, and 9 were recorded as discrete structures. 152 and 10 seemed to be separated by a large open space. As Figure [133] illustrates, excavation during the 1972 season revealed that structures 152 and 10 were contiguous units. An extension of the excavation to the east would probably demonstrate that structure 9 was also a contiguous unit. Structures 154 and 11 to the south may also be contiguous units of the same complex. There may very well have been a complex of contiguous buildings extending completely across ridge one at this point from the Rio Zapote on the north to the first small arroyo on the south. West of this complex, there was at least one outbuilding (153). We are unsure how far the complex extends to the east. The southeast corner of structure 10 was not reached in our long east-west trench and the stucco floor outside the door off the northeast corner of patio number 13 suggests that there may not be a break in construction here either. Clearly, we are dealing with much larger structures than our original survey sug-

gested. Structures 152 and 10 alone cover at least 500 square meters.

"The excavation of structure 152/10 was completed during the last three weeks of July 1972 under the direction of the author. The structure consisted of three contiguous complexes of rooms arranged around an open patio. One of these complexes (I) was considerably smaller than the others. This complex consists of the rooms numbered 1 and 2 and the patio numbered 3. (All room and patio numbers refer to Figure [133].) Room 4 may have opened onto patio 3 at one time but was probably part of Complex II before being sealed off. Complex I appears to have been added onto the southwestern corner of Complex II. The southwestern corner of Complex I was badly damaged by looters. The damage was done between the end of the 1971 season in late September and the beginning of the 1972 season in June.

"Patio 3 may have been roofed. On the south it opened onto a porch through a portal with two circular columns. There was probably a raised curb separating the patio and the porch. On the east the patio was closed by the wall of room 4. Doorways 64 and 60 centimeters wide led from the patio to rooms 1 and 2 on the west and north. The floors of both rooms were slightly elevated above that of the patio. For some reason, the north wall of room 2 was two adobes thick. Excavations beneath the floors of rooms 1, 2, and 4 revealed no previous construction stages. They also revealed that refuse had been used as fill behind the platform retaining wall. Atop this fill there was a layer of cobbles and then a thin layer of fine, well packed earth. This well packed earth served as the base for a lime-plastered floor. Beneath the floor of room 2, there were three features. One, resting on the fill, was a small circular stone hearth. The second was the burial of a child. The child (less than two years old) had been placed in a flexed position within a small hole excavated into the original land surface. There were no grave offerings with the burial. The third was a cache of two vessels, one inverted over the other. The vessels were resting on the old land surface. The vessels were probably dedicatory caches placed at the time of the room's construction. Large 'cajete' fragments around the looter's excavation may have been from a similar cache beneath the floor of the porch. Similar caches of two vessels were found beneath the floor of room 10 and in the platform wall of structure 10. In none of these cases was there anything held within the vessels. Presumably, if they had ever contained an offering, it was something perishable.

"North of Complex I but still atop the same platform

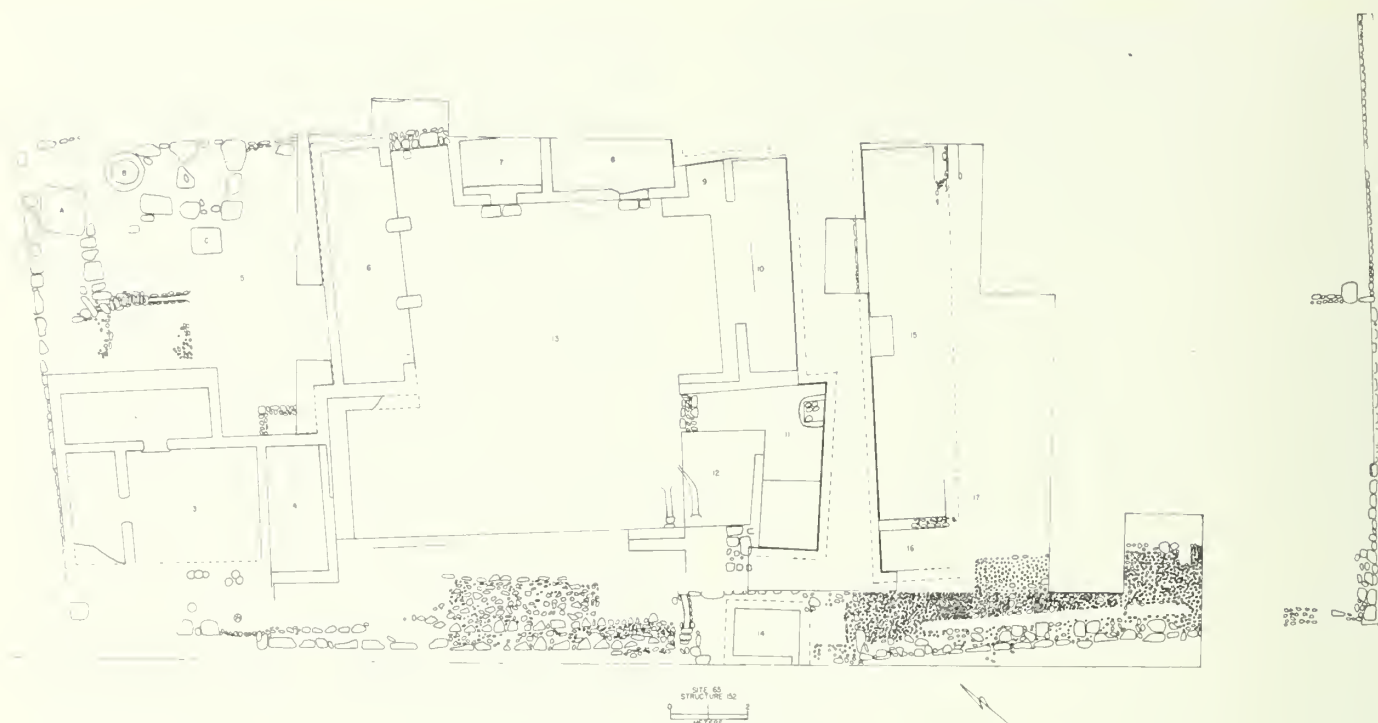


Fig. 133. Structure 152 of Tr 65.

was an activity area numbered 5 on Figure [133]. This area was open to the air and drained by a small covered canal through the west platform wall. The canal ended just outside the platform wall. Run-off from this work area was not collected. A ceramic tube found on the floor of area 5 near the back wall of room 6 may have been a drain spout fallen off the roof of room 6. The floor itself was of well packed earth except for a small area of stucco around the mouth of the canal. The canal itself was stucco lined.

"Within area 5 there were three stucco lined basins (A, B, and C). Two of the basins were rectangular and one was circular. The circular basin had a low stucco collar. Because of their ubiquity and the use of similar stucco lined basins for water storage in Coxcatlan today, we strongly believe that the primary function of these basins was water storage. The final uses of basins A and B were quite different, however. Basin A was half-filled with refuse including a great deal of ash and broken pottery. The upper portion of A was filled with sediment washed and blown into it. Basin B was completely filled with broken plaster. The plaster, removed from a floor or fallen from a wall, so completely filled the basin that there was hardly any earth inside the basin. The third basin (C) appears to have remained open and in use.

"Just north of basin C and east of basin B, several very large boulders formed a rectangular outline. Within the rectangle formed by these boulders there was considerable refuse. The refuse contained numerous large sherds and some ash. The boulders were resting on 'tepetate.' Within the rectangle formed by the boulders and lying on the 'tepetate' there were a painted figurine and two large polishing stones. Adhering to the edge of one of these stones was lime plaster.

"Between the boulder enclosure, basin C and the back wall of room 6, the floor was almost completely covered with a thin deposit of ash. In this same area, a potstand was resting on the floor. Just east of basin C, there was a large olla with disintegrating lime in the bottom.

"At one time or another, various activities probably took place in area 5. A number of the features and artifacts suggest that one of these activities was the preparation of building materials, specifically lime plaster. 'Tepetate' or old plaster may have been burned in the boulder enclosure. Water for slaking the lime would have been available in the nearby basins. The slaked lime could have then been carried to the construction site in ollas. At the construction site the slaked lime (mixed with sand) was applied to floors

and walls and smoothed with polishing stones. Old plaster removed from floors and walls was collected and brought back to area 5 and thrown into basin B. When the job was completed, the polishing stones were brought back to the work area and pitched into the boulder enclosure and forgotten.

"If lime plaster was being prepared in area 5, where was it being used? It is quite possible that the plaster was used in the refurbishing of Complex II. Complex II consists of two long, open rooms (6 and 10), two smaller, closed rooms (7 and 8), and a platform (12) arranged around a very large, open patio (13). All of the rooms are raised above the level of the patio. The two smaller rooms have steps with a single riser in front of their narrow doorways. Before the construction of platform 12, room 11 opened onto patio 13. Room 4, across the patio from room 11, may have also opened onto the patio. In such a case, room 4 may never have formed part of Complex I. The principal entrance to this complex was from the south. On the south, a stairway with two risers gives access to the platform. This stairway begins as far west as the back wall of room 4 and probably extended as far east as room 14 or the back wall of room 11. Another looter's hole in the area of room 14 had destroyed the eastern end of the stairway. The fact that the stairway extends as far west as the back wall of room 4 is another reason for believing that this room was part of Complex II. Because of erosion, the fill of the platform is visible above the stairway. This rubble fill was probably covered with stucco at one time.

"There is a low step down from the platform to the floor of the patio. The width of the opening from the patio onto the platform is impossible to determine because of erosion. We do know that the opening was partially closed by walls. A second, smaller entrance to patio 13 was through a doorway between rooms 6 and 7. The open patio was drained by a covered canal in its southeast corner. The original canal was abandoned when platform 12 was built. A second canal was built a little further to the west. The new canal intersected the original beneath the front floor of the platform. The single channel of both canals is located just west of room 14 on the plan.

"The border around the patio just east of room 4 is a low bench. It was built at the time that room 4 was sealed off. Room 6 has one feature not recorded elsewhere in our excavations. Rectangular pillars have replaced the more common circular pillars as roof supports. The reason appears to be for structural considerations. Rooms around sunken patios usually have their circular columns set back from the edge so that the

weight of the roof is more evenly distributed through the platform. In the case of room 6, which is not very deep, the front wall and the columns were set right along the platform edge. In such a situation, the larger rectangular pillars were probably more stable than the smaller circular columns. Also, by extending the rectangular pillar to the patio floor, some of the weight of the roof was exerted directly on the patio floor and not on the platform of room 6.

"The back entrance to patio 13 was closed with a wall of uncut stone sometime prior to the building's abandonment. Only a 2-by-1-meter square was excavated north of this doorway. A small patch of stucco at the level of the patio floor against the north wall of the square and at the level of the patio floor would seem to indicate that another plaza or another structure was located north of structure 152/10.

"Rooms 7 and 8 were small rectangular rooms with narrow entrances. Like room 6, their front walls lay right along the edge of their platforms. Room 6 is balanced by room 10 on the east side of the patio. A two-meter square excavated through the floor of room 10 revealed an earlier construction stage. The edge of the platform of this earlier stage is visible on the plan as a straight line segment approximately a meter east of the edge of the platform on which room 10 was built. At the same time that room 10 was constructed, the plaza floor was renewed by the addition of a fresh coat of plaster. Also when room 10 was built, a cache of two vessels was placed at the bottom of a hole excavated through the original floor of room 10.

"Prior to the construction of platform 12, only the southern portion of room 11 was separated from the patio. In this southern part of the room there was a raised platform 1.52 meters by 1.76 meters. When platform 12 was built, a passageway into room 11 was maintained for a time. Eventually, the walls of the room were taken down, the lower portion of the room was filled with adobes from the walls, and the old entrance was sealed by a wall of uncut stone. Sometime prior to the filling of the room, three vessels were partially intruded through the floor of the room just north of the raised platform. These three vessels contained ash and small fragments of burned bone. One of the three vessels contained a single greenstone bead suggesting that a single burial is represented. The final use of room 11 was as a burial chamber.

"The top of platform 12 was quite near the ground surface and little cultural material was found on it. On the patio floor in front of the platform, however, there was a large pile of broken god effigy censers, 'xantiles.' At least eleven different effigies were represented. They

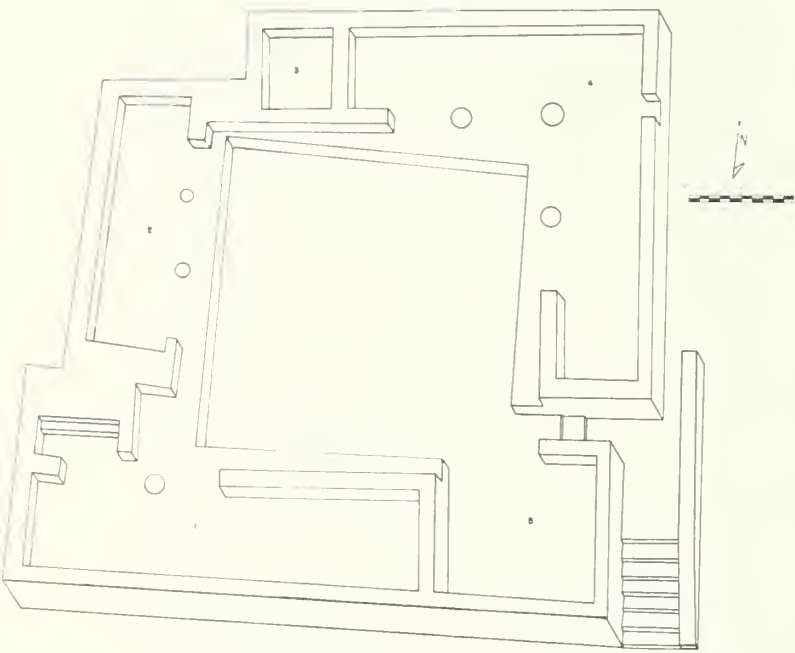


Fig. 134. Structure 66 of Tr 65.

are all painted, and, when they are restored, it should be possible to identify the gods represented. This close spatial association between what appears to be a household altar and a burial suggests the possibility of some sort of cult of the dead or at least an association in the residents' minds of a dead member of their group and the gods. When platform 12 was removed, we discovered the earlier canal. More interesting than the canal were three small ceramic artifacts included in the platform fill. The artifacts appear to be open molds for casting type IV B 'hachas' (Pendergast, 1962:525).

"Adjacent to Complexes I and II but on its own platform was Complex III (structure 10). Only the western range of rooms (15 and 16) were excavated. These rooms opened onto an open, sunken patio (17). The preservation of Complex III was poor, and only a small portion of the complex was exposed. It generally appears to resemble Complex II.

"The final structure excavated on ridge one was structure No. 21. Although our excavations were later to reveal equally large structures on ridge one, at the beginning of the 1972 field season, we believed that structure 21 was much larger than any of the other structures. It was larger (approximately 30 meters across and 20 meters deep), yet it was also simpler. On the surface, the structure seemed to have only one internal division, a wall extending half the way

across the long axis from the middle of the northwest wall. Surface collection of 21 yielded only a handful of sherds and artifacts. Our speculations as to the function of this seemingly anomalous structure included a market area for the craft specialists whom we believed to be living on ridge one and an early Colonial church.

"In early July 1972, Larry Rimmel and I directed the excavation of a trench along the northeast wall of structure 21, a two meter wide trench across the middle of the structure along its short axis, a trench along the one internal wall, and a series of two meter squares in the northeast corner. In terms of potsherds and artifacts recovered, these excavations were singularly unproductive. A narrow apron of stucco was found along a short portion of the northeast wall and fragmentary patches of stucco were found in the northeast corner. The surface of the downhill portion of the structure between the south wall and the single internal wall consisted of a pavement of small stones. Above the internal wall, there was earth fill. After only five days of work, we seemed to have reached (or long passed) the point of diminishing returns. Yet, we had no more idea as to the function of the structure than we had five days before. It was as if the structure was not used for anything.

"A comparison of structure 21 with structures 152/10 and 66 (see below) did reveal some similarities. Structure 21 was quite similar to the platforms on which both of these other structures were built. In both cases (and also in the case of structure 88; stage A at site Tr 205; and the structures of operations 1, 2, and 3 at site Tr 62), the first consideration was the construction of a level platform to serve as a base for the structures. These platforms were first outlined by walls of uncut stone. The number of courses in each wall depended upon how much the area had to be built up to reach a relatively uniform level. Behind these walls, fill was added until the desired level was reached. In the case of structure 152/10 (and the upper level structure in operation 3 at site Tr 62), a layer of cobbles was then placed on the fill, and the cobbles were covered with a thin layer of fine grained earth. The floor plaster was then laid down on this fine grained stratum. Structure 21 looks very much like an eroded platform of this type. The scarcity of artifacts and the lack of evidence for walls suggest that perhaps the platform was erected as a base for a structure which was never built. If some other activity was conducted on this platform, it did not involve many non-perishable artifacts.

"On the second ridge, there are twenty-eight small structures. Although these structures are not randomly distributed over the ridge, they do not fall into readily

discernible clusters. Just north of structure 37, a small, crude stone face was found in the survey. No other features of note were recorded. None of these structures has been excavated.

"In general, the structures on the third ridge [Fig. 132] appeared from surface indications to be larger than those on the three other ridges. Twenty-six structures were identified and assigned numbers in the field. Structure 66, the largest and best preserved, was partially excavated by William Doelle near the end of the 1971 field season. Structure 66 is composed of a series of at least four contiguous units [Fig. 134]. One of these units was completely excavated and three others were tested.

"The large multi-unit complex is located along the south side of the shallow arroyo bed separating ridges two and three. The unit completely excavated consists of five rooms arranged around a sunken patio. The materials and techniques used in the construction of this unit are very similar to the materials and techniques used elsewhere at site Tr 65. The building materials employed include worked and unworked stone, adobe bricks, stucco, wood, and fill consisting of sand, gravel, and refuse. An understanding of the original construction process can best be gained by a step by step reconstruction [see Fig. 134].

"A solid foundation for the structure was prepared by removing most, if not all, of the shallow topsoil so as to expose the bedrock. On the bedrock, courses of uncut stones were laid to outline the exterior walls of the building. Along the barranca where the slope is steep, large boulders were utilized. Along the other sides of the rectangular outline, smaller stones were used. These courses of stones served as bases upon which adobe bricks were laid. Along the eastern wall, the adobes were laid down on bedrock itself. For added strength, the adobe walls were not laid right along the exterior edge of the stone base, but were inset slightly. Fill was added behind the north exterior wall to bring the ground surface up to the level of what eventually became the patio floor. This surface sloped down toward the northwest corner from the southeast corner.

"A second rectangular set of uncut stone walls was erected within the first. This second set of walls was a little over two meters inside the first. A rectangular area was left open in the northwest corner. Between this second set of walls and the exterior set which had now been carried up to the same level, more fill was added. The effect of this operation was to create a raised platform around all four sides of an open area. In the northwest corner, however, there was a gap in

this elevated platform where the level was the same as that of the open area.

"The exterior adobe walls were carried on up to form the exterior walls of four rooms. Inside these walls a thin cap of clay was placed over the fill; short interior walls of adobe were erected only partially enclosing the rooms; and round pillars were erected. The short interior walls and the columns were set back from the platform edge so that the weight of the walls and the roof would be more evenly distributed through the mass of the platform. The roof, probably of pole and beam construction, was borne by the walls and the round pillars.

"The use of pillars rather than solid interior walls gave the rooms a lightness and airiness that would not have been otherwise possible. The pillars themselves vary only slightly in their construction. Six pillars were found in the unit completely excavated and two in contiguous units. Six of the eight pillars had round cut stone discs at their base. These discs were placed directly on the clay capping the platform fill. The two other pillars had several stones set in a clay matrix rather than a single cut stone disc at their base. Above the round stone base, a cylindrical section of adobe was added and then a second cut stone disc was added. The circular pillars were carried up in this manner to the desired height and then completely encased in stucco. From the number of cut stone discs lying about, it appears as though there were at least three discs per pillar.

"The final step in the construction was the application of stucco to the surfaces of the floors, walls, pillars, and a small lip twenty centimeters wide around the edge of the patio. The center of the patio was of hard-packed clay. It was never stuccoed. Modeled stucco glyphs decorated the finished structure.

"Access to the building was possible by two entrances. The main entrance was in the northwestern corner where an 'L'-shaped hallway and a series of 6 steps led down to the barranca. The stairway was constructed of flat, uncut stones of various shapes and sizes. The width of the stairway is approximately one meter. The steps are on the average 33 centimeters deep and the risers have an average height of 13 centimeters. The second entrance was a very narrow one in the west wall. The opening was only 40 centimeters wide. This entrance would have provided easy access to two of the three contiguous units, and it may have been used when disposing of refuse, as there was a concentration of refuse along the outside of the south wall.

"The interior, sunken patio sloped down in the

northwest corner so that any rain that fell would flow toward the main entrance and down the stairway. An open drain along the exterior face of the west wall also spilled down the stairway. A curious feature of the construction is a small drain in room three. This drain appears to disappear into the fill of the platform. Such an arrangement would seem to be unsound structurally.

"Figure [134] depicts a reconstruction of the final building. There were five rooms arranged around an open patio. Four rooms (rooms 1-4) were elevated above the level of the patio and the fifth room (room 5) was on the same level as the patio. Although the analysis of artifacts is in a very preliminary stage and only a few artifacts of obvious functional significance were recovered, a few tentative suggestions as to differences in activities from room to room can be made.

"Room one, although heavily eroded along its northern wall, had an interesting and well-preserved niche in its southeastern corner. The niche had been created by constructing short walls against the south and east walls of room one. Small, red-painted areas around the base of the wall abutting the east wall may indicate that the niche was painted red. Along the southern or back wall of the niche there was a low bench approximately 36 centimeters wide. Scattered across the floor of the niche and adjacent parts of room one were the pieces of a large, elaborate effigy censer. The god depicted has the facial coloring of a Black Tezcatlipoca. The niche may have been a household shrine. Set upon the low bench would have been an effigy censer depicting a specific god of importance to the members of the household. This niche may be the functional equivalent of platform 12 in structure 152.

"Although there was no ash or charcoal found in room five, this room may have been a kitchen. Located at patio level and in the northeast corner of the building, room five was situated so that smoke from the cooking fires would have been carried away from the other rooms by the locally prevailing easterly winds. Sitting upright next to the west wall of the room was a large 'cantaro.' The 'cantaro' was partially buried in the fill below floor level. If the vessel had been used for water storage, burying its base beneath the floor would have kept the water cool. There were also two Coxcatlan Brushed bowls sitting, one stacked upon the other, on the floor of this room. In addition, our surface collection yielded three similar bowls from a pot-hunter's pit dug within the walls of room five.

"The small enclosure recorded on the reconstruction as room three is curious. The western wall separating this enclosure from room four was low and did not

completely seal off the areas from one another. This fact along with the small size of the room (1.56 meters by 1.36 meters) suggests that it may have been a storage area. An unexplained feature of this room is a floor level drain passing halfway through the low western wall and then leading down into the fill below the structure.

"Rooms one, two, and four may have served as living quarters. In room two there was a higher percentage of polychrome sherds and trade sherds than in the other two rooms. This may indicate that room two was the living quarters of the head of the household. Included in the debris on the patio floor was a single spindle whorl.

"Because of the absence of artifacts associated with specialized craft activities, with the possible exception of a single spindle whorl, and the presence of such 'high status' items as a copper awl, a copper needle, and a jade figurine, Doelle and I have suggested that this may have been an elite residence. 'The residence group, perhaps an extended family, shared in the storage of goods, in the preparation of meals, and in household ceremonial activity centered around a household shrine. This ceremonial activity centering on the residence group would have been in addition to or in conjunction with a ceremonial cycle in which the entire community participated. [The three contiguous units] . . . may have also been occupied by extended families. These extended families linked by residence may have also been bound together by kinship affiliations larger than the family and by political and economic alliances. Thus, structure 66 may have been the residence of an elite group of kinsmen with common social, political, and economic aspirations' (Sisson and Doelle, 1971:7-8).

"The type of residence unit that we had in mind when we wrote the above has been reported by Eva Hunt (1970) for the 16th century town of Atlatlauca in the Cuicatec. 'In Atlatlauca, the aristocracy and caciques had large homes with interior courtyards and roof-terraces . . . The size of the cacique's household . . . was apparently related to the fact that part of his administrative staff was attached to and resided permanently in separate courtyards in the compound . . . (p. 150). This body of retainer kinsmen served as his advisors; they resided in and were maintained by the overlord's household, their habitations being located within a large compound, in adjacent courtyards' (p. 166).

"As a result of excavations during the 1972 season which increased the size of our sample of structures,

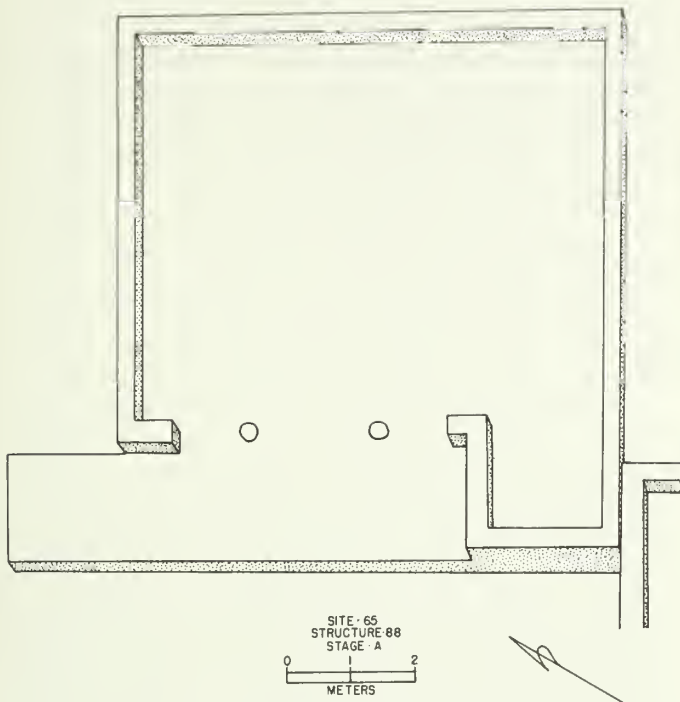


Fig. 135. Structure 88, Stage A of Tr 65.

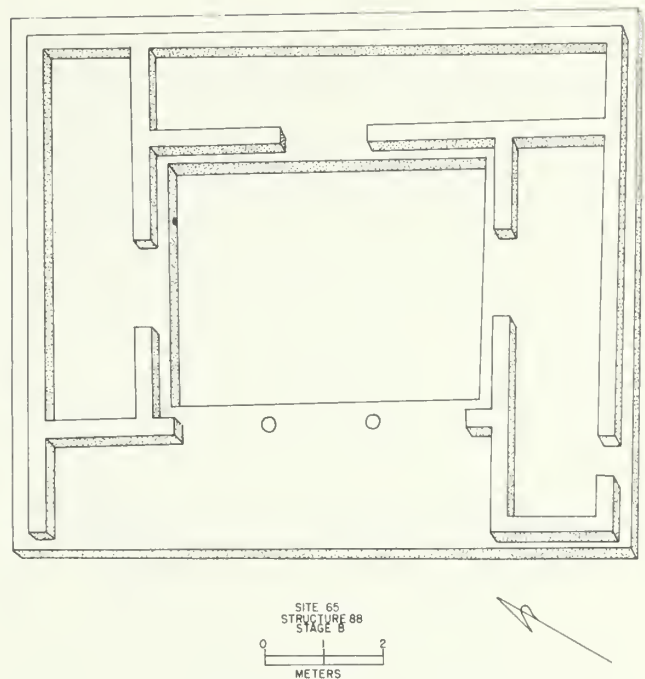


Fig. 136. Structure 88, Stage B of Tr 65.

structure 66 no longer appears to be so strikingly different. Now, I'm not so certain that structure 66 is an elite residence.

"Ridge number four is the largest of the four ridges and the most complex with respect to the number and diversity of structures [Fig. 132]. Seventy-one structures were recorded on ridge four. Included in this number are two groups of low mounds of uncut stone and earth. Each mound group is composed of a large central mound approximately three meters high and fifteen meters in diameter at the base, a low, rectangular platform mound west of the central mound, and two to four small mounds. One stone mound (116) was isolated by itself. Some of the other structures form vague groups. Others appear to be randomly scattered over the ridge.

"During the 1972 season, one of the low platform mounds (II) was partially cleared. The mound was in very poor condition as a result of looting. On the east, facing the larger central mound (I), there was a stairway of three or four risers running almost the entire length of the building. Long, shallow rectangular rooms arranged in two rows were atop the platform. Each room had been modified or rebuilt several times. Because of their poor preservation, especially near the edges of the platform, it was difficult to determine the

direction in which the rooms opened. Presumably, they opened to the east and faced on the central mound. Excepting obsidian blades and potsherds, the only artifact recovered from this building was a hollow figurine depicting an unidentified female deity.

"The only other structure excavated on ridge four is structure 88. This structure was excavated by a small crew during the first three weeks of the 1972 season . . .

". . . Structure 88 closes the eastern side of a large patio. The other sides of the patio are bounded by low rises which are almost certainly buried buildings. The depression in the rise bounding the patio on the south is probably the result of post-abandonment erosion. The depression in the northwest corner, however, may have been an outside entrance to the patio. The close proximity of the structure 88 complex to the wall segments 87 and 90 suggests that this complex like structure 152/10 was not isolated but was contiguous with other similar complexes.

". . . [In the earliest construction stage] the stucco floor was laid down atop a low platform. The platform had been constructed by erecting retaining walls of uncut stone behind which fill, primarily refuse, was placed. Figure [135] is one possible reconstruction of this stage. Walls have been reconstructed only where the stucco floor turned up at a line of adobe bricks.

The circular elements are the stone bases of columns. The structure appears to have been a single large room with a small attached room in the southern corner. The room opens onto a long rectangular porch through a wide entranceway divided by column roof supports. The porch itself gives onto the large sunken patio.

"This reconstruction is not altogether satisfying. Presumably, the large room was covered by a roof. At least there were no provisions made to drain the floor. But the area to be covered by the roof is quite large. Certainly, a flat beam and pole roof would have been impossible without additional columns in the room interior. Even if there had been additional roof supports or if beams of sufficient length to span the room were brought down from the mountains, the outer walls would not have been strong enough to support the weight of the roof. Rather than a flat roof, there may have been a pitched, thatched roof or even no roof at all.

"The function of this structure is not known. Structure 88 was originally selected for excavation because of the high percentage of obsidian blades on the surface. As was the case with structure 153, excavation of the structure did not reveal any large concentrations of blades or chipping debris. Very little cultural material was found on the floor of the stage A structure. There were a number of 'xantil' fragments recovered in a trench along the western edge of the porch, but these could just as easily have belonged to stage B as to stage A. At one of these times, the western end of the porch probably housed a shrine.

"... [In stage B] thick walls of uncut stone with rubble fill were erected. Most of these walls follow the old adobe wall lines. One completely new wall line on the northwest squared-off the structure. The plan of these stone walls resembles a rectangle set within a 'U' which opens to the west. Within the inner rectangle, a sunken stucco floor was preserved. This floor, separated from the stage A floor by a layer of fill, turns up at the four encircling stone walls. A covered drain which passes through the two northwest walls drains this sunken floor. Between the stone walls there was a fill. The surface of this fill was exposed on the ground surface prior to excavation. It was probably originally covered with stucco. None was preserved. Adobe walls were almost certainly raised atop the stone walls. These were not preserved either. The eastern corner of both stages A and B were destroyed subsequent to the abandonment of stage B. It appears as though someone removed the stone wall for building material. In stage B we find the now familiar floor plan, elevated rooms arranged around a sunken patio. The three rooms were probably

covered by a beam and pole roof. The patio was left open to the sky to admit light and air, and rain water was carried off by a small drain. One of the rooms, the southeast room, probably had a small doorway in its southeast wall, giving access to an adjacent building.

"Cutting across ridge number four in an arc, there is a shallow depression 0.25 meters deep and 18 meters across. This depression curves across the ridge from the bank of the Arroyo Coxcatlan to the small seasonal arroyo which separates ridges three and four [Fig. 132]. The depression was discovered during the 1971 field season. It immediately occurred to us that the depression might be a canal for diverting water from the Arroyo Coxcatlan across ridge four to the small local arroyo. This diverted water would contribute to flow in the Rio Zapote which flows northwest of the Cerro Colorado de Pueblo Nuevo and could be utilized to irrigate land immediately adjacent to site Tr 65. If the water were not diverted, it would flow down the Arroyo Coxcatlan to the east and south of the Cerro Colorado de Pueblo Nuevo. Today, there is no land suitable for irrigation on this side of the Cerro for almost three kilometers. When one does get far enough down the Arroyo Coxcatlan to find suitable land, there are other Late Venta Salada Phase sites nearby. If the depression were a canal, its construction must have had important economic and political consequences.

"During the 1972 field season, a small trench, 2 meters by 6 meters was excavated across the lowest section of the depression. Immediately below a thin layer of decaying organic matter (I), there was a stratum (III) with numerous Venta Salada Phase potsherds. This stratum was shallow and was only found in the lowest part of the depression. The soil matrix was very coarse in texture with small to large angular and sub-angular stones. The sherds were washed into the depression either during or subsequent to the Postclassic occupation of the surrounding area. Beneath this stratum there lay a thick stratum (V) coarse in texture with poorly sorted rounded and subangular stones and pebbles. There was no cultural material in this stratum. In the center of the trench, this stratum extended down to a maximum depth of approximately 1.5 meters. At both ends of the trench this stratum overlay 'tepetate' (VI) at a depth of from 55 to 90 centimeters. Beneath the lowest part of the depression on the surface, there was a gap slightly over three meters wide in the 'tepetate.' Beneath stratum VI in the center of the gap in the 'tepetate,' there was a stratum (VIII) with well sorted, small, rounded pebbles in a fine matrix. The matrix was finer than a fine sand and dusty when troweled. The color was light yellowish brown.

No stratification was visible in the stratum. This stratum may well represent sediment deposited in the bottom of a canal. It was not recognized as such in the field since we had expected thin layers of fine sediment in the canal bottom. We still regard the problem of whether the depression was a canal or not as unresolved.

"Not recognizing stratum VIII as the canal bottom, we carried the excavation down almost another two meters. The lower strata consist of gravels, sands, and clays. Most are horizontally laid and appear to underlie the 'tepetate.' They all give the appearance of having been laid down by natural agents prior to the formation of the 'tepetate.' The uppermost of these gravels (IX) actually begins a little above the level of stratum VIII to the north and dips to the south beneath stratum VIII. In the uppermost part of this stratum (IX) a few gray ware sherds were encountered. In my field notes, they were recorded as being either Formative or Classic, probably of the type Quachilco Gray. Thus, if the depression cutting across ridge four were a canal, its use predates the Postclassic occupation of site Tr 65 by perhaps 1,000 years or more. This next season, two additional two meter square pits will be excavated in the center of the depression at even intervals along the depression from our original trench. The purpose of the pits will be (1) to see if the break in the 'tepetate' continues, (2) to see if stratum VIII or a comparable stratum is present, and (3) to determine the gradient of stratum VIII and its juncture with the underlying stratum.

"In addition to the 157 structures recorded on the four ridges, there were eighteen structures located atop erosional remnants across the present channel of the Arroyo Coxcatlan to the east [Fig. 132]. None of these structures were excavated. It is possible that the area occupied east of the Arroyo was once more extensive and that the traces have been washed away."

Coxcatlan Viejo

It was also during the summer of our first season of 1961 when Peterson was allowed to test Tr 62, Coxcatlan Viejo, an ancient town just east of the present day Coxcatlan village which was a capital of a small city-state at the time of the Spanish conquest. Again, he made a huge surface collection and, as well, dug a trench in arbitrary levels somewhere in Section D [see Fig. 137].

Again, any attempts at reconstructing the way of life of the inhabitants from this type of excavation seems pointless, in light of the fact that E. B. Sisson has been redigging the site for the Peabody Foundation from

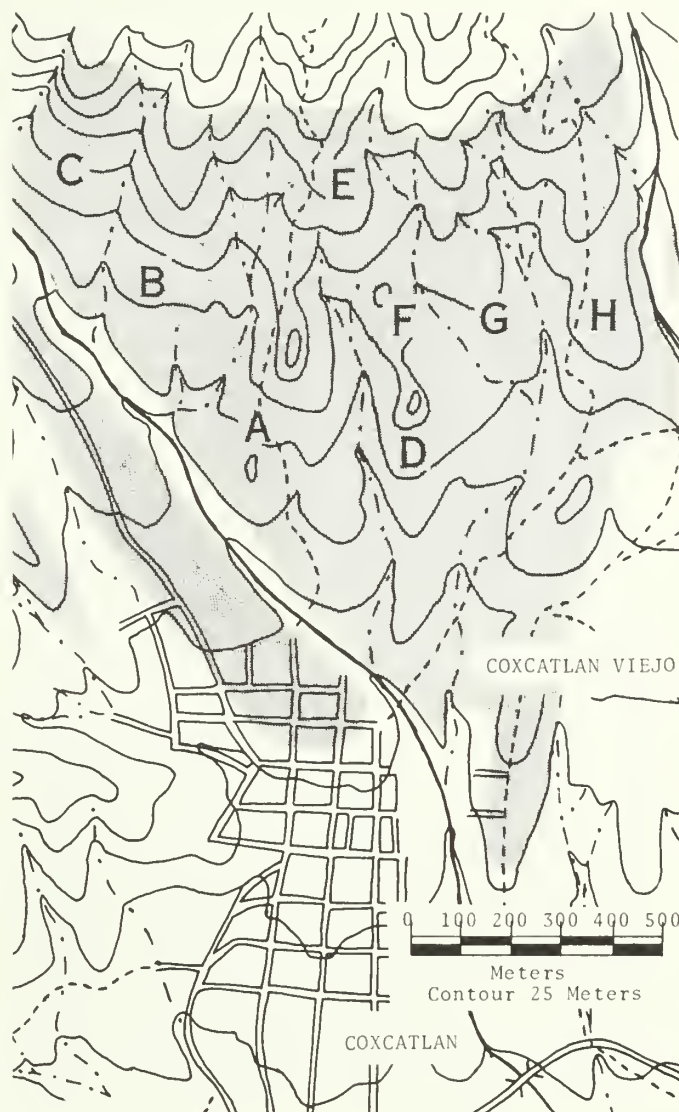


Fig. 137. Contour map of Coxcatlan Viejo.

1971 through 1974. His final report should give much valuable information about this site, and his Annual Report of 1973 is a start in this direction. The following is republished from the Annual Report without comment (Sisson, 1973, pp. 64-77).

"Site Tr 62 (Coxcatlan Viejo or Sansuantzi) was the location of the early Colonial 'cabecera' of Coxcatlan. The site is located immediately east of the present town of Coxcatlan (Fig. 137). Most of the site occupies a series of steep ridges between the Arroyo Soyolapa and the Arroyo Atempango. Areas of Late Postclassic occupation also occur on the north bank of the Soyolapa east of Coxcatlan and south of the Atempango around the abandoned hacienda of Atempango. The

area covered by the site is approximately one square kilometer (100 hectares or 247 acres). Not all of this area was continuously occupied. Occupation tends to have concentrated on the terraced ridge slopes and in a narrow band of gently sloping land between the foot of the ridges and the Arroyo Soyolapa.

"The site lies within the alluvial slopes or thorn forest environmental zone. Until about twenty years ago, the area was undisturbed except for people herding their goats, cutting firewood, or looking for archaeological objects to sell. About twenty years ago, the land was divided among several 'ejidatarios' and began to be farmed. Subsequent plowing, artificial terracing, and the construction of irrigation canals have severely damaged the site. For example, in late May 1972, an 'ejidatario' completely leveled a two-meter-high mound of uncut stone set in adobe mortar so that he would no longer have to plow around it. Destruction would have been even greater except for the fact that the water supply is erratic and the fields are not planted each year.

"The site occupies an excellent natural defensive position. To the east are the high mountains. To the north and northeast there is a high, easily defended ridge line. To the south, the barranca of the Arroyo Atempango is quite deep and the ridge line extending southwest from group H (Fig. 137) overlooks the barranca. The single weak point is a gap approximately half a kilometer wide through which the Soyolapa channel passes. It is possible that the channel of the Soyolapa was originally further north (it may have occupied the bed of the first seasonal stream north of the present channel as indicated on Fig. 137) and joined the present channel south of the present plaza of Coxcatlan. If this were the case, the barranca of the Soyolapa would have completely closed the gap. In addition, the Soyolapa would have provided a permanent source of water within the defensive perimeter.

"Immediately across the barranca from Coxcatlan, the site continuously occupies a series of low ridges and intervening valleys. As one moves uphill to the east, the ridges become steeper and the intervening barrancas of small seasonal streams become quite deep. Here the occupation is limited to the ridge line and terraces along the sides of the ridges. The steeper inclines are unoccupied.

"The site is divided spatially by the occupied ridges and the intervening barrancas. Taking advantage of this situation, letter designations were assigned the ridges and their associated cultural features. If there were breaks in the occupation of a ridge line, separate letter designations were assigned. For example, groups

A, B, and C refer to clusters of cultural features occurring on three ridges (A, B, and C) that descend to the Arroyo Soyolapa. Groups D, E, and F occupy a single ridge line south of ridge A. The lower groups (F and D) are separated from each other and group E by saddles in the ridge line. Groups G and H occupy two ridges south of the ridge of groups D, E, and F. Some, but not all, of these groups have a consistency in their structural composition which suggests that there may have been social divisions of the community corresponding to the spatial divisions necessitated by the topography.

"Along the Arroyo Soyolapa at the foot of the ridges coming down from the sierra, there are three large architectural groups. Each consists of mounds of uncut stone arranged around a plaza. The plaza and the mounds were constructed atop massive artificial terraces. The largest of these architectural groups is located at the base of ridge A. The local name for the principal mound of this group is Sansuantzi. Paredes Colin (1960:187) derives Sansuantzi from San Juanito. The Spanish diminutive 'ito' has been replaced by the Nahuatl diminutive of respect 'tzin' or 'tzi' and the voiceless velar fricative 'j' (x) has become a voiceless alveolar fricative 's' (c). San Juanito was derived in turn from San Juan Evangelista, the patron saint of Coxcatlan. Looting of the mound Sansuantzi is documented as far back as the mid 19th century (Paredes Colin, 1960).

"The size of the Sansuantzi mound and the fact that the name has been applied specifically to that structure suggests the possibility that the mound may have been the site of the earliest church built in Coxcatlan. If this is the case, the church was built atop a pre-Conquest mound using the pre-Conquest construction technique of setting uncut boulders from the arroyo in a mud or adobe mortar. There is little doubt that Coxcatlan at the Conquest was located across the Arroyo Soyolapa from the modern town. Sometime early in the Colonial period, the inhabitants were resettled across the barranca at the present site. The present site of Coxcatlan is more level than the old site, and, therefore, more suitable for a proper gridded town. Calipan and Teotitlan del Camino were relocated in a similar manner. If we are lucky, there may be archival evidence attesting to these relocations. The present church in Coxcatlan was probably built in the 16th century. It may have been built to replace an earlier church across the barranca. Alternatively, the present church may be the original church and only a shrine may have been built on Sansuantzi to purify the mound which had been the center of pagan rites.

"Sansuantzi occupies the eastern side of a large elevated plaza. A long, low platform mound runs the length of the northern side of the plaza. There are four badly looted mounds along the northern edge of the plaza. These mounds overlook the Arroyo Soyolapa. Two test pits, excavated by Doelle and Stein during the 1971 season, were located in the plaza area just west of Sansuantzi. These pits revealed that at this point there is over three meters of fill beneath the plaza floor. Further west, the fill is undoubtedly deeper. There was little cultural material in this fill. Significantly, however, a small number of Texcoco Black-on-Red and Texcoco Black and White-on-Red sherds were included in the fill (56 sherds; 0.9% of total). Excavations during the 1972 season yielded Texcoco Black-on-Red sherds from the fill of all three terraces excavated. We believe that the presence of trade wares from the Valley of Mexico in the fill of all the terraces tested has important implications for the history of Coxcatlan.

"Immediately north of the Sansuantzi group and at a lower level, there is a second complex of two mounds facing one another across a small plaza. Both of the mounds have been badly looted. The mound on the north has been so badly damaged that it appears to be two mounds on a single platform. Still further northeast, there is a third complex of mounds arranged around a plaza. This complex consists of two long rectangular mounds or platforms along the eastern and northern sides of a plaza, and a series of three small mounds along the western side. As was the case in the Sansuantzi group, there is no mound along the southern side of the plaza. In 1971, there were two small stone mounds southeast of the eastern platform mound. By June 1972, both had been destroyed.

"In addition to the three mound-plaza complexes along the Arroyo Soyolapa, there are seven complexes located on the ridges. These complexes are at the core of the lettered architectural groups described above. The group B complex consists of two mounds about 1.5 meters high facing one another across a small plaza. In groups A, H, and E, there is a single mound set in a small plaza at the core. In group F, the core is a small plaza with low platforms rather than mounds. The most complex of these mound groups is that of group D. Here two mounds approximately three meters high face one another across a small plaza. There is a low mound in the center of the plaza between the two larger mounds. A low platform runs the length of the plaza on the south. There is no structure on the north. The seventh mound-plaza complex is located further down the ridge to the west of group H.

"During the 1971 field season, an intensive system-

atic surface collection was made along the Arroyo Soyolapa, on most of the terraces of ridges B, A, and G, and on the terraces of ridges D, F, E above the group D plaza. The area collected comprises approximately one half of site Tr 62. The rest of the site will be collected at the beginning of the 1973 season. Preliminary counts are available for the areas collected and some tentative interpretations of the results can be offered.

"There are differences in the distribution of artifacts and ceramics within and among the seven lettered architectural-ridge groups collected. In all, we collected a total of 47,413 potsherds in our systematic, intensive survey. This collection may be compared with the general surface collection made by Frederick Peterson in the 1960's for the Tehuacan Archaeological-Botanical Project (33,714 potsherds). Our collection contains a higher percentage of El Riego Plain, El Riego Polished, El Riego Gray, Teotitlan Incised, Coxcatlan Red, and Coxcatlan Gray than does the collection of Peterson. Peterson's collection, on the other hand, has a higher percentage of Coxcatlan Striated Buff, Coxcatlan Polychrome, Coxcatlan Red-on-Cream, Coxcatlan Black-on-Orange, and Coxcatlan Red-on-Orange. In general, our 1971 collection appears earlier than that of Peterson. A number of factors may account for this difference—(1) progressive destruction of the site may have exposed earlier deposits; (2) Peterson's workmen may have collected more of the decorated potsherds which catch one's eye; (3) different areas of the site may have been surface-collected.

"We were interested in the distribution of exotic wares since we assumed that classes of higher rank would tend to monopolize imported vessels. The number of exotic potsherds in each lettered group was expressed as its percentage of all sherds in order to facilitate comparison. The total sample size was broken down as follows: group A—13,874; group B—19,725; group D—393; group E—8,339; group F—778; group G—3,985; group H—49. As might have been expected, group A had a much higher percentage (12.3%) of exotic sherds than did any of the other groups (group B—8.0%; group D—5.6%; group E—5.4%; group F—4.2%; group G—5.9%; group H—8.2%). If we eliminate group H with its small sample, there appears to be an inverse relationship between the distance from the site center along the Arroyo Soyolapa and the number of exotic sherds. Do differences in the distance of residences from the site center correspond to differences in the social distance between the occupants? The distribution of exotic wares suggests that this may be the case.

"The imported pottery was broken down into three

categories on the basis of its origin. These categories are (1) the Valley of Mexico, (2) the Gulf Coast, and (3) "Cholula Polychrome." The third category probably includes pottery from both northern Puebla and the Mixteca Alta. An examination of the distributions of these three categories reveals that the percentage of imports from the Gulf Coast and "Cholula" do not vary greatly from group to group with the exception of group H with its small sample. The difference between group A and the other groups is in the very high percentage of Valley of Mexico imports in group A. The percentages of Valley of Mexico imports are as follows: group A—10.4%; group B—6.7%; group D—5.1%; group E—3.8%; group F—3.2%; groups D, E, and F—3.8%; group G—3.9%; group H—0.0%. Again, as one moves away from the center of the site, the percentage of imported wares declines. Above, it was suggested that this difference may reflect social distance. Another possibility not completely discarded is that the difference may be chronological and reflect the passage of time and the shrinking of the population.

"The great bulk of the Valley of Mexico imports consists of Texcoco Black-on-Red and Texcoco Black and White-on-Red (10.1% of total sample). Small quantities of Texcoco Moulded (0.2% of total sample) and Aztec Black-on-Orange (0.1% of total sample) also occur. Because of the small sample of both of these wares, little can be said about their distribution. Both occur in all of the groups for which we have large samples.

"The sample of locally made, decorated ceramics is small but reflects in general the pattern of the imported ceramics, a greater concentration near the center of the site. 93.9% of the Coxcatlan Polychrome sherds was recovered from groups A and B. (Groups A and B have 71.2% of all pottery.) The remaining 6.1% was recovered from group E. (Group E has 17.7% of all pottery.) The number of all locally made, decorated wares on each ridge expressed as a percentage of the potsherds on the ridge is as follows: group A—1.5%; group B—0.6%; group D—0.0%; group E—1.1%; group F—1.2%; groups D, E, and F—1.0%; group G—0.2%; group H—0.0%.

"Forty-seven mold-made spindle whorls were recovered. The distribution of these are as follows: group A—8 whorls, 17.0% of total number of whorls, 5.8; group B—19 whorls, 40.4% of total number of whorls, 9.7; group E—17 whorls, 36.2% of total number of whorls, 20.3; group G—3 whorls, 6.4% of total number of whorls, 7.5. The third figure represents the number of spindle whorls per 10,000 potsherds. Spindle whorls occur in four groups, are more numer-

ous in groups A and B, and are much more concentrated in group E.

"One hundred three obsidian cores were recovered. In itself, this number of cores from a single site is significant. During the four years of the Tehuacan Archaeological-Botanical Project, only 41 fine cores and 64 core fragments were recovered in both excavation and surface collection. Of this total (105), forty (39%) were recovered from the surface of four sites (Tr 1-6, Tr 75-6, Ts 204-12, and Tr 57-16). Three others were from the surface of Tr 62. The spatial and chronological distribution of these sites suggest the possibility that the production of obsidian blades from polyhedral cores was centered in one or two sites within the Valley at any one time. At the time of the Conquest, these sites were Tr 62, Coxcatlan Viejo, and Tr 1, Tehuacan Viejo. Control of the distribution of obsidian seems to be centered in two of the three centers in the Valley which probably had 'tlatoque' lineages. No cores are reported from the third, Teotitlan del Camino (Tr 115A).

"The distribution of obsidian cores within Tr 62 is as follows: group A—45 cores, 43.7% of total cores, 32.4; group B—34 cores, 33% of total cores, 17.2; group E—17 cores, 16.5% of total cores, 20.3; group G—7 cores, 6.8% of total cores, 17.6. The third figure represents the number of obsidian cores per 10,000 potsherds. Again, the greatest concentration is in the center of the site around group A. Obsidian blades and flakes are also concentrated in group A (41.7% of all obsidian blades and 52.7% of all obsidian flakes).

"The highest concentrations of manos and metates are also in group A which has 50.8% and 55.0%, respectively. The percentage of the total number of manos in each of the other groups is as follows: group B—23.1%; group D—1.5%; group E—4.6%; group F—6.2%; and group G—13.8%. The percentage of the total number of metates in each of the other groups is as follows: group B—30.7%; group D—0.5%; group E—6.3%; group F—1.1%; and group G—6.3%.

"Within each of the groups, artifacts are not randomly distributed but are concentrated in a small portion of the area covered by the group. For example, twenty-one of the forty-five obsidian cores from group A are concentrated in an area just below and north of the Sansuantzi complex. In a smaller portion of this area north of Sansuantzi, there was a concentration of manos and metates. Five of the eight obsidian projectile points were from the Sansuantzi plaza and the area to the north.

"In group B, the projectile points (6 of 8) and the obsidian cores (29 of 34) were concentrated around

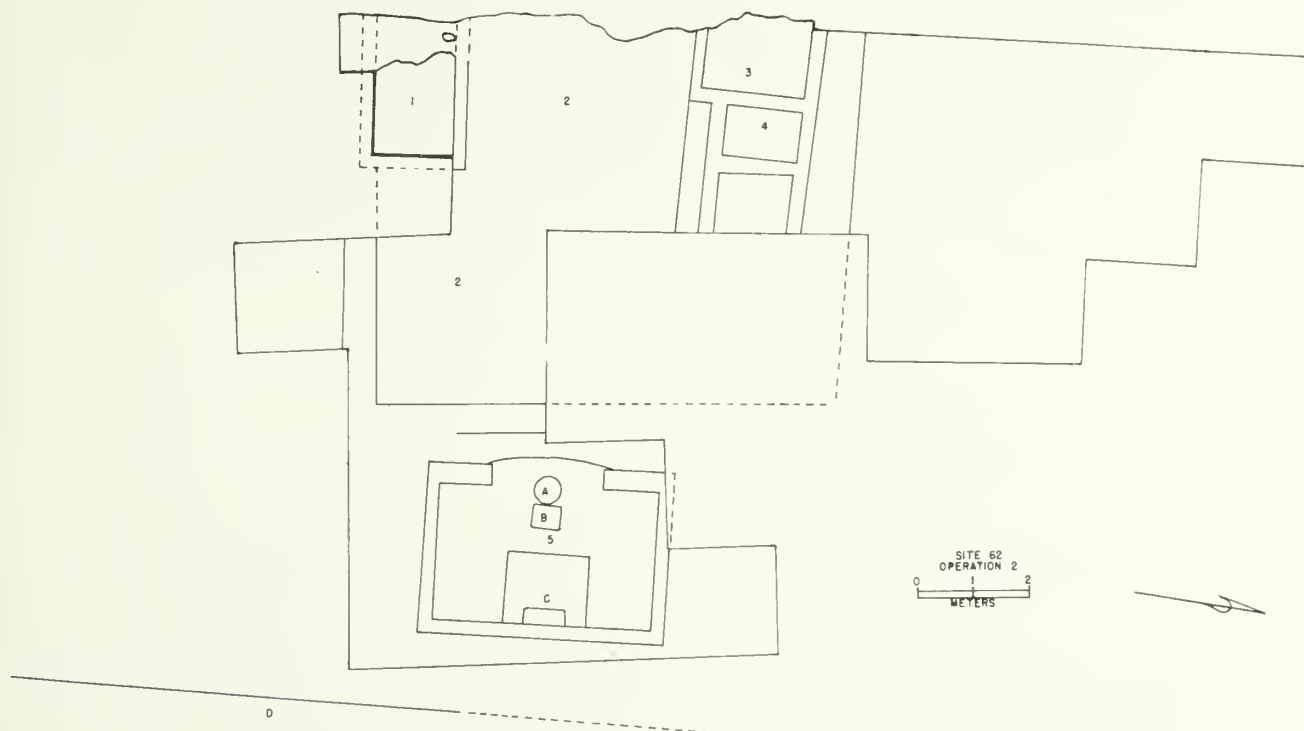


Fig. 138. Possible altar structure (lower half) and architectural features of Tr 62.

the lower plaza along the Soyolapa. Twenty of the cores were recovered from a series of small terraces between the plaza and the bank of the arroyo. As in group A, obsidian knapping was concentrated near a major plaza and mound complex. In both groups A and B, the mold-made spindle whorls are widely distributed with only a single concentration on terrace 45 of group B (four spindle whorls). Coxcatlan Striated Buff occurs in both groups A and B. The only concentration is on two adjacent terraces in group B. 2.6% (44) of the potsherds from terrace 198 and 5.3% (13) of the potsherds from terrace 213 are Coxcatlan Striated Buff. These percentages are comparable to those from the excavation of structure 162 at site Tr 65, a structure that was certainly a pottery workshop. Concentrations of metates (13.8% of total from ridge on terrace 213) and manos (26.7% of total from ridge on terrace 187) occur on widely separated terraces of group B.

"Groups D and F have no noticeable concentrations of artifacts. In group E, eleven of the seventeen mold-made spindle whorls occur on the slopes beneath terraces 78, 71, 73, and 103. On the slopes beneath terraces 70 and 71, there were concentrations of Coxcatlan Striated Buff sherds. Finally, on the slopes below terrace 103, there was a concentration of obsidian arti-

facts—five cores (33.3%), one projectile point (33.3%), one ear spool, and 20.1% of the blades.

"In group G, there was a single concentration of obsidian artifacts on two adjacent terraces (171 and 172). These two terraces yielded four of the seven cores, fifty-three of the two hundred thirty-four blades, and one of two projectile points. There was also a high flake-to-blade ratio. Overlapping this concentration of obsidian artifacts, there was a concentration of manos and metates on terraces 164, 170, and 172.

"During the 1973 season, we will extend our intensive, systematic surface collection in an attempt to locate additional concentrations of artifacts. In addition, we will undertake the excavation of some of the terraces on which we have discovered concentrations of artifacts. The analyses of materials recovered from the survey and the planned excavations will allow us to pinpoint areas of specialized production activities."

"During the 1972 season, three separate excavations were undertaken at site Tr 62. All of these excavations (Operations 1, 2, and 3) were located on group A terraces above the Sansuantzi mound. The first excavation (Operation 1) was located at a point where the trail to the 'rancheria' of Pala had badly eroded terrace 130 exposing three superimposed floors. The hori-

zontal extent of the excavation was limited. Although the uppermost strata were exposed over an area of thirty square meters, only eight square meters were taken down to bedrock. The primary objective of this excavation was to obtain sealed stratigraphic samples of pottery from beneath the exposed floors. We succeeded in obtaining small samples from beneath five superimposed floors. Preliminary counts are available on a portion of the material recovered. 1.7% (43) of the sherds tabulated so far are Texcoco Black-on-Red. These sherds occur beneath all but the lowest of the five floors. The sample from beneath the lowest floor, however, is relatively small—225 potsherds.

"The second excavation (Operation 2) was conducted on terrace 132. Approximately 115 square meters were exposed. The excavation was begun under the direction of Lawrence Rimmel and was completed by the author. The plan of excavation (Fig. 138) is incomplete for the northern section. In this area, the floors were very close to the surface (less than twenty centimeters deep) and badly preserved. The poor preservation and the superimposition of at least four different floors directly on top of one another have made their interpretation difficult. The interpretation has also been made more difficult by the intrusion of numerous burial pits through the floors. An interpretation of this area will be presented in a subsequent report.

"The southern portion of the excavation revealed an extremely interesting complex of rooms around a small patio (No. 2 in Fig. 138). The floor of this patio is approximately one meter below that of the rooms in the area to the north. The single dark line north of rooms 3 and 4 in Figure [138] represents the southern edge of the higher terrace. The lower complex of rooms has been badly eroded along its western side where there is a sharp drop of five or six meters to the terrace below. Exactly how much of the complex has eroded is impossible to determine without extensive excavations on the terrace below. Along the eastern side of the complex, room 5 was built almost up against the base of the west wall of the terrace above (D). South of the lower complex, the terrace has been so badly eroded that it is doubtful that any structures have been preserved.

"There are four rooms (1, 3, 4, and 5) arranged around three sides of patio 2. Only one of these (5) opens onto the patio. A second very small room (4) may open either onto the patio or room 3. Rooms 1 and 3 were entered from the west. Little cultural material was found on the floors of these rooms. From the northeast corner of the floor of room 1, fragments of two painted, god effigy figurines were recovered. In

the fill of room 4 there were mano and metate fragments, but these were not found lying on the room floor. Room 5 was raised one meter above the plaza floor. Access from the patio was by a stairway with very high risers. The room (5) was elevated above the patio floor and the floors of the other rooms as though to create a visual focus. Because of the length of the patio (8 plus meters), however, it would have been impossible for anyone on one of the lower terraces to have seen into the room.

"Access to room 5 was through a doorway almost two meters wide. The center axis of the room is almost exactly east-west. On the center axis of the room and partially blocking the doorway, there were two features. One (A) was a circular feature which resembled the base of a circular column. Upon excavation, however, feature A was found to be a shallow, circular basin (52 centimeters in diameter) raised slightly above the level of the floor. Immediately east of feature A was feature B, a solid cube 52 centimeters by 44 centimeters and 25 centimeters high. The core of feature B was stone set in adobe. Over this core there was a coating of red painted plaster. Abutting the east wall of the room and still on the center axis were two raised platforms (C). The lower platform was 148 centimeters by 128 centimeters and 10 centimeters high. The upper platform was smaller than the first (76 centimeters by 28 centimeters and 7 centimeters high) and rested on top of it. Together, the two platforms form a raised dais. No cultural material was found on the floor of the room.

"An excavation four meters by two meters was made beneath the floor of patio 2 near its western edge. The excavation was made to determine whether there had been any earlier construction stages and to obtain a pottery sample from beneath the floor. A second lower patio floor was found almost immediately beneath the upper. The north wall of this excavation lay along the central axis of room 5 and patio 2. Half in our excavation and half in the north face of the excavation, we encountered four flexed adolescents or younger burials and a single covered vessel containing ash and burned bone.

"In the excavation of El Riego Cave (Tc 35), a structure almost identical to room 5 was exposed (MacNeish, personal communication). On the cave floor near the structure there were a number of god effigy fragments, and intruded into lower strata from the floor level of the structure there were several flexed burials. We believe both room 5 and the structure in El Riego Cave to have been shrines. Seated on the raised platform there would have been one or more

god effigies. Since the sacrifice of animals was usually a part of every ritual and human sacrifice was often practiced (Nicholson 1971:432; PNE IV:217), it is possible that the rectangular block (B) was a sacrificial altar and the basin (A) was designed to receive blood or to burn incense to the god or gods. An analysis of the burials from in front of the shrine will be interesting. Could they have been sacrificed? Or could they have been women who had died in childbirth and been buried in a shrine or temple? (See Ruz Lhuiller 1968:70, 76.) The adult burials from El Riego include both females (8) and males (3) according to Anderson (1967:91-92).

"Operation 3 exposed approximately 112 square meters of terrace 61, the first large terrace above the Sanuantzi mound, and approximately 64 square meters of a smaller terrace south of terrace 61. The preservation on both terraces was poor as a result of years of successive plowing. On the lower terrace, we were able to follow a stucco floor which occurred in widely scattered patches. Against the upper terrace wall, a stairway and portions of two rooms were exposed. Both rooms overlay the stucco floor which we had been able to trace over most of the lower terrace. This terrace was abandoned prior to the abandonment of the upper terrace (61). East of the stairway and against the upper terrace wall, there was a shallow midden of refuse which had been thrown over the side of the upper terrace. The lower terrace had been abandoned some time before this was done and a sterile layer of earth several centimeters thick had accumulated on the floor. The refuse consists primarily of potsherds. A very high percentage of these are imported wares. One type which occurs frequently is Texcoco Moulded. The sherds of this type are from large ladle censers with hollow handles. Also included in the refuse are very large blades of gold-green obsidian and one copper 'needle.' It was my impression at the time of the excavation that this refuse contained a much higher percentage of exotic items than did any of our other excavations. It will be interesting to see if our analysis bears this out.

"The excavation of terrace 61 revealed three probable construction stages. The uppermost stages were preserved over a very small area. The earliest stage was the only one which had been preserved over any significant area. It too has been damaged by plowing. Portions of five large rooms were exposed. Until this stage has been more fully exposed and the material from the floors analyzed, there is little to be said about the architecture or the possible functions of the rooms. In general, however, the rooms and the round column

supports are larger than those of any structures at sites Tr 65 and Tr 205."

Summary of the Cultural Sequence in the Coxcatlan Locality

Human history in the thorn forest alluvial slopes was indeed unique to the valley. Here, under *continuing* favorable conditions, man steadily progressed toward a rather high degree of development. This quality was revealed to us in our investigations in the amazing Coxcatlan Cave, where beautiful stratigraphy and abundant ecofacts and artifacts gave us a very long sequence of over 12,000 years, lacking only materials of the Early Formative. Further, the micro-environment had been exploited in a wide variety of ways and at all seasons of the year. Factors responsible were not purely ecological, for the alluvial slopes had few if any resources that did not occur elsewhere as well, and, moreover, its foods were abundant only in the wet season. Its usefulness was due rather to its strategic central position along the east side of the valley. Parts of it take the shape of a long narrow strip of land wherein man, while maintaining a relatively permanent base camp, could exploit not only the resources of the nearby alluvial slopes, but also, and with relative ease, foray out to exploit other resources of the dissected canyons to the south, the nearby valley steppe environs and humid river bottoms, parts of the travertine slopes to the west, and the higher and more humid mountaintops to the east. As in no other zone, man prospered in the thorn forest, albeit at the expense of the other zones.

Briefly, we shall review our cultural sequence in this particularly fortunate environmental zone. It begins well back in the Pleistocene when this region was probably a grassland, housing such extinct animals as antelope, horse, giant turtle, giant jackrabbit and probably mammoth.

Our earliest cultural phase, Ajuereado, began during this period and lasted until the Recent, around 6800 B.C., when we see the concomitant change over to modern floral and faunal conditions. At this time nomadic microbands, with a relatively simple material culture, usually restricted their visits to the spring or other parts of the wet season when they would hunt, trap, participate in rabbit drives, and collect seeds and fruit, pick pods, and cut the leaves of *Agave* and *Opuntia*. Not until near the end of Ajuereado did they begin to utilize this particular subsistence pattern during the winter and fall seasons as well.

El Riego, with a very different material culture, was a period of change in the subsistence and settlement

patterns. In the early half of the period, microbands continued, but in a well-scheduled pattern, to enter the area during the wet season. By this time they were basically plant collectors rather than hunters and trappers and were beginning to take their first halting steps towards the cultivation and domestication of such plants as avocado, mixta squash, amaranth, chili, and the like. Even this very limited production of food-stuffs seems to have resulted in a rather different settlement pattern during Late El Riego times, from 6000 to 5000 B.C. Not only were there the expected wet-season microband camps and a few of the dry season, but also, and more fundamental to the times, were the macroband camps that began to replace the microbands, lasting for longer periods than did the smaller and less permanent camps. There is a suggestion then that populations in the thorn forests were increasing.

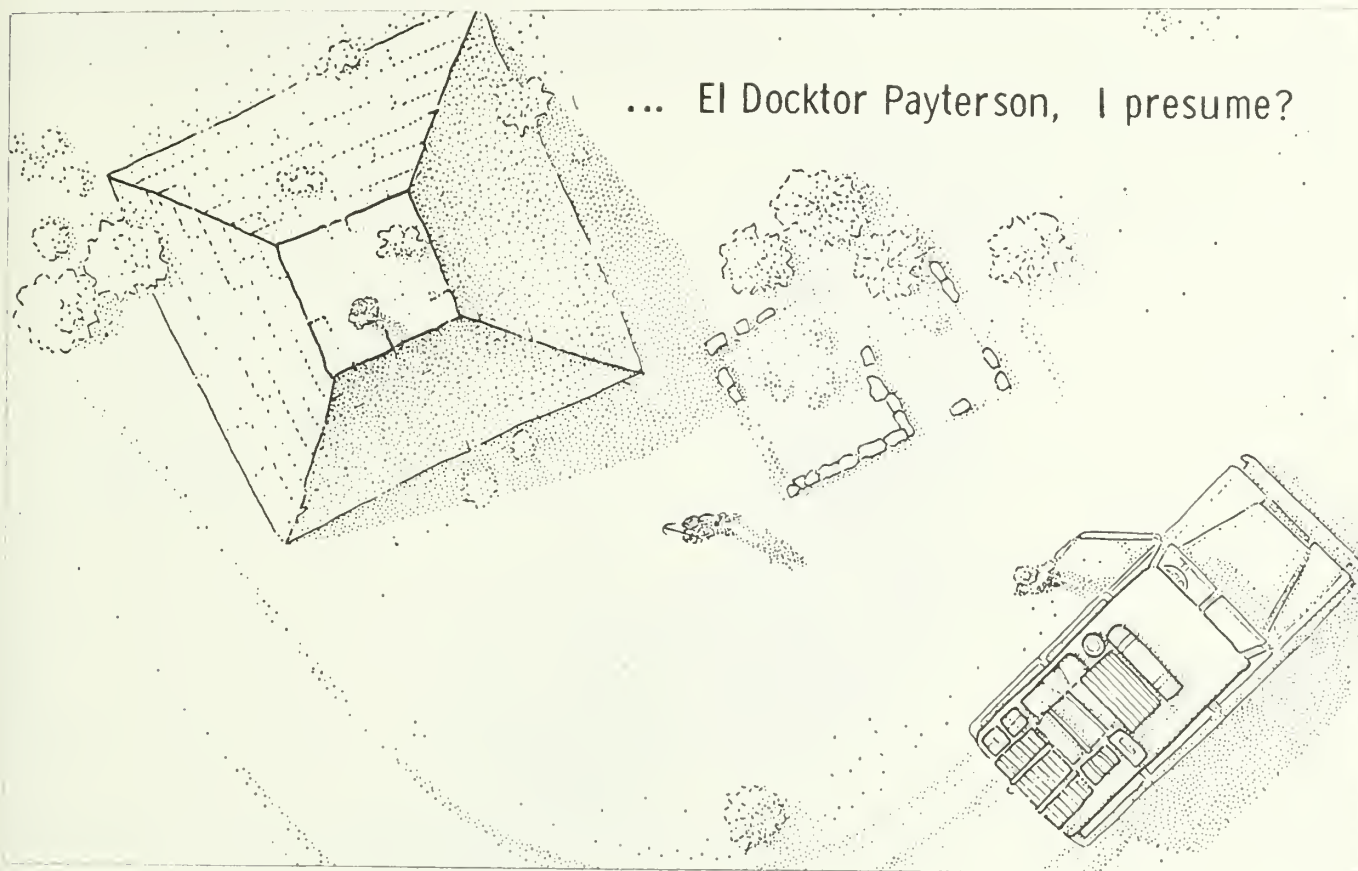
About 5000 B.C., the El Riego Phase ended, and, with the advent of the Coxcatlan Phase, a new way of life and a new material culture took hold. In this new cultural system we see a new exchange system of direct procurement and, in part due to this phenomenon, an increase in hydro- and barranca horticulture bringing about many new cultivars and domesticates such as corn, beans, moschata squash, gourds, black and white sapote, and, perhaps, chupandilla. All occupations were by now lasting for at least two, or more, seasons and were, for the most part, macrobands. Populations may again have increased slightly, but in neither the Coxcatlan nor the preceding El Riego Phase did there seem to be any real population pressures.

The Abejas Phase, from 3400 to 2300 B.C., with a settlement pattern characterized by macrobands functioning during multi-seasons, was, in that respect, not

radically different from the Coxcatlan Phase, but its material culture was markedly changed, and the amount of domesticates or cultivars consumed during Abejas was greatly increased. Evidence from other environmental zones suggests that these Abejas occupations represented forays into the thorn forest zone for special purposes—hunting, planting, harvesting, and the like—away from base camps or hamlet homes in the more humid river bottoms. This pattern of living seems to have continued into Early and Middle Formative times, between 2300 and 500 B.C., in the humid river bottoms where more intensive barranca agriculture could take place. No sites or occupations of this period were discovered in the Alluvial Slopes micro-environment.

Major occupation in the thorn forest began once again in Late Formative times. Hamlets, villages, and even towns were formed during the Palo Blanco Phase, 150 B.C. to A.D. 700. Our excavations, however, were only concerned with occupations in caves, and most of these sites were planting or harvesting camps.

Most of our excavated Venta Salada components were of a similar nature; that is, planting or harvesting camps at cave sites. However, we did test two major ruins, Tr 65, a town site, and Tr 62, a city that was the capital of a city-state. Future researchers in sites of the last two Palo Blanco and Venta Salada Phases should give us much more information about the beginning civilizations, both in the Alluvial Slopes micro-environment, and in all of the Tehuacan Valley. Such should do much to supplement and complete the sequence already represented by a wealth of Preceramic materials.



CHAPTER 7

The Archaeological Reconnaissance

Richard S. MacNeish, Frederick A. Peterson, and James A. Neely

OUR SETTLEMENT PATTERN STUDY presented in this chapter is an obvious outgrowth of our archaeological reconnaissance, and as such the basic purposes of the two are interconnected. Our initial efforts in survey were undertaken to define the region or culture area we would select to study, that is, that geographical unit with a relatively uniform set of environments, which could be correlated with a relatively similar cultural tradition or group of cultural traditions (see Fig. 140). Once we had defined the area for our intensive study, the next problem was to find stratified sites, which upon excavation, we hoped

would outline the cultural sequence for the area. A by-product of this search for stratified sites was, of course, the many unstratified sites, as well as the stratified sites deemed not worthy of excavation. Once our sequence had been established by excavations, and the materials from the surface studied and classified as to chronological phases or periods, these numerous sites or components could give us a considerable amount of information about settlement patterns throughout our sequence.

Thus, our problem then was to classify and arrange in chronological order the surveyed sites. However, it

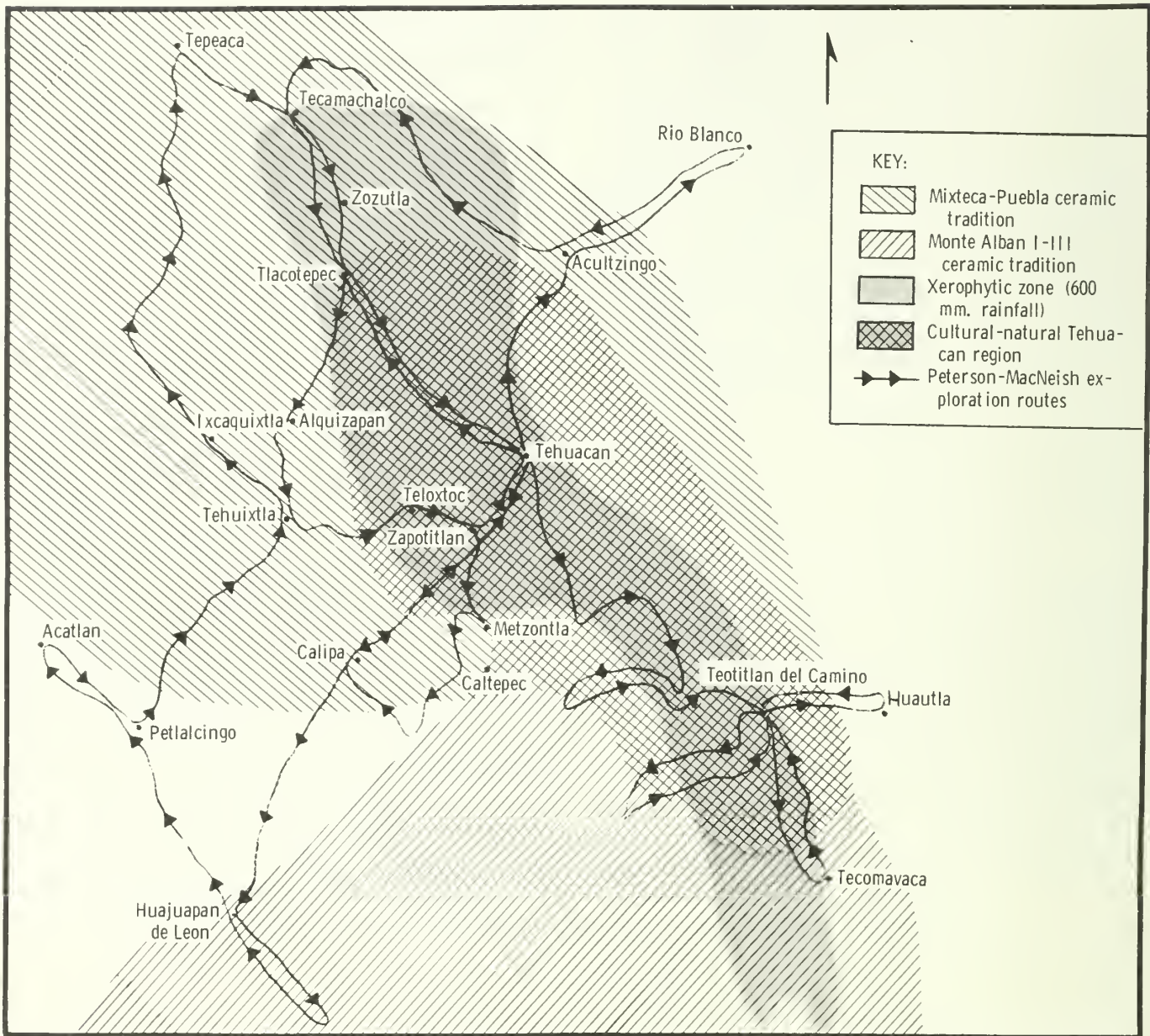


Fig. 140. Map of the Tehuacan region, showing routes of initial exploration, the Mixteca-Puebla ceramic tradition, the Monte Alban ceramic tradition, and the xerophytic vegetational ecozone. The overlapping of the three zones defined our area of investigation.

became immediately apparent once this was done that much of the survey site information was not complete and could not be used to attack specific problems relating to such settlement pattern studies as population growth, land use, changes in divisions of labor and status systems, changes in economic and subsistence systems, etc. Therefore, we selected a number of sites from each time period for more intensive investigations

and more accurate mapping. Once these problems were solved and more problem-oriented information collected, we felt we might be able to bring this data to bear on the problem of changing social organization, as well as to examine the whole problem of the causal relationships between changes in the settlement pattern and other social changes. Thus, we had a sequential hierarchy of settlement problems that very much

determined techniques and methods of data collection and necessitated a cooperative effort by a whole series of investigators.

The Tehuacan Region

The initial defining of the area for investigation was undertaken by the two senior authors, Peterson and MacNeish, with an able assist during part of it by Angel García Cook, then a student in the Escuela de Antropología de México. Basically, this endeavor had two parts, a study of the pertinent literature and/or archaeological materials, and a field examination. Analysis of local materials consisted, in part, of a study of archaeological information. It was pretty scant; there were only two or three local collections along with the three reports by E. Noguera of his tomb excavations in Tehuacan and his diggings of Postclassic remains in Calipan. It became immediately apparent to Peterson, who had long experience with Mexican pottery, that there were two basic ceramic traditions in the region: (1) an earlier one related to or the same as that of Periods I to III of Monte Alban and the adjacent Oaxaca Valley to the south, and (2) a later one that was part of the Mixteca-Puebla ceramic tradition that had been described for the Cholula site in Puebla to the north of our valley. The second set of information we collected concerned the environment, and here we were very lucky, for it was pointed out by José Luis Lorenzo, even before the expedition began, that the Papaloapan Commission had been intensively studying some of the ecological aspects of the region. We immediately collected all of their pertinent literature as well as their topographic maps and aerial photography for study. It was a dream come true, for not only were there studies of temperature, rainfall, and seasonality, but even soil types, some geology, vegetational zones, and land uses. Apparently the Tehuacan Valley was, environmentally, a xerophytic unit with well-defined boundaries. To the north around Tecmachalco, soil types, amounts of rainfall and even topographic features changed. To the east, the desert zone was bounded by the lower western slopes of the steep Sierra Madre mountains which, at higher elevations, received more rainfall and had lush vegetation and forest soils, all of which made it readily distinguishable from our desert zone. To the south, our desert zone, with under 600 mm. of rainfall, extended for a considerable distance from the town of Tehuacan. In terms of topography, low rainfall, soils, and general xerophytic vegetation, there was a definite break south of Cuicatlan at the pass of Dominiquillo leading into the Oaxaca Val-

ley. However, we consider our southern boundary to occur just south of Los Cues where our valley narrows drastically, and the lower elevation and higher temperatures result in a more tropical sort of desert around Tecmachaca. To the west is a definite break in vegetation at the lower elevation of the Mixteca hills, roughly from Cuicatlan north to Zapotitlan and Tlacotepec, where our desert gives way to more forested areas.

Now the question was whether the Tehuacan desert zone correlated with the pre-determined areas of the two cultural traditions, thereby making a cultural-natural sub-area or region. This had to be checked on the ground, so Peterson and MacNeish set out from Tehuacan on a series of forays. The first took us far afield, first in a southwestward direction to Huahuapan de Leon, then northward to Acatlan and Petlalcingo, again north to Ixcaquixtla and to Tepeaca, before turning back to Tehuacan. A second trip north to Tlacotepec, south to Alquizapan, and east to Teloxtoc, Zapotitlan, and Tehuacan covered new ground in the western part of our area. This was followed by a more southerly trip from Tehuacan to Zapotitlan, Metzontla, Caltepec, Calipa, and back to Tehuacan. Although Mixteca-Puebla sherds and sites occurred throughout this area, it now became obvious that, correlating with zones of xerophytic vegetation, desert soils, and less than 600 mm. of annual rainfall, were Monte Alban-like sherds and sites, while outside this more specific area were other kinds of Classic remains. Sites with predominantly Thin Orange pottery and new types of architecture occurred at Metzontla on the south, Calipa and Santa Catarina on the west, while Tlacotepec had Classic Cholula or Teotihuacan-like sherds. A northeastern trip from Tehuacan to Acultzingo, to Rio Blanco, then north to Tecmachalco and San Hipolito and back to Tehuacan via Zozutla, showed a similar lack of Monte Alban-type sherds. Although Zozutla, Acultzingo, and Tecmachalco had limited rainfall, the desert vegetation was different, as were the soils, so all were thought to be outside our culture area. Thus we defined our northern and northwestern boundaries. Then we moved south and southeast—first, a trip up the bed of the Rio Calapilla to just below Coatepec, then a second brutal trip by horseback from Teotitlan del Camino to the headwaters of the Xiquila and back, and, finally, trips from Teotitlan south to Tecmachaca and Teotitlan east toward Huautla. In this southern area Monte Alban-like remains occurred everywhere, while the Postclassic remains were more limited and coincided roughly with the desert zone. Both trips to the southwest up the Rio Calapilla and Rio Xiquila revealed that just outside the

desert zones were Postclassic remains with considerable black and gray wares, vaguely like Monte Alban IV and V, unlike the more Cholula-like materials from within our zone. Also, southward at Tecomavaca, although it was within the desert zone, we found these same types of Postclassic remains, while to the north at Los Cues we were still finding Mixteca-Puebla sherd complexes. The trip up the mountains toward Huautla was very brief and our survey very superficial, but by the time we began to find sites with sherds near Huautla with its forested vegetation, it began to be apparent that neither the Classic nor the Postclassic ones were very similar to those we had found near Teotitlan del Camino.

Thus, by the end of this six-week period of dashing about we felt we could delimit our cultural and natural region. There seemed to be a high correlation of an area of Mixteca-Puebla sherds and Monte Alban I-III sherds with the natural zones that had xerophytic vegetation, less than 600 mm. of rainfall, and poorly nurtured vegetational soils. In terms of our very brief initial survey the boundaries of the area were as follows: to the south there was a Postclassic cultural break between Los Cues and Tecomavaca, to the east the natural environment as well as the cultural remains changed between Teotitlan and Huautla, while to the northeast the natural environments and the Classic remains shifted between Chapulco and Acultzingo. To the north, sites with Monte Alban I-III sherds disappeared between Tlacotepec and Tecamachalco, while to the west our desert zone disappeared and our Classic sites with gray sherds gave way to ones dominated by sites with Thin Orange sherds between Santa Catarina and Teloxtoc, between Acatepec and Calipa, as well as between Teotitlan and Metzontla. To the southwest at the headwaters of the Rio Calapilla and Rio Xiquila our desert zone gave way to a more heavily forested area just east of where sites with Cholula-like ceramics were replaced with sites with ceramics more like those of Monte Alban IV-V.

Now that we knew the bounds of our region, the intensive survey could begin. One of our authors, Fred Peterson, was in charge of this survey. He was assisted by his faithful sidekick, Francisco Molina, as well as by countless local guides. This survey continued for roughly sixteen months (February 1961 to June 1962) and 370 sites were discovered. The general methods of recording this reconnaissance data are explained in Volume 1, pages 25-28, so there is no need to repeat it here.

The third stage of our settlement pattern study had

to wait until our chronology of phase or subphase, based upon a chronology of ceramic and non-ceramic artifact types from excavation, had been established. This didn't happen until 1964. Once this had been done, however, we could start opening the survey bags of catalogued artifacts site by site, classify the artifacts into our types and thus have a basis for classifying each site into its correct phase or phases, or subphase or subphases. This long, arduous job was undertaken by the senior author and Ann Harvey, with the assistance of Agustín and Narciso Tejeda. They, in turn, appended the lists of the quantities of artifacts by types for each site to the original survey site sheets. The senior author then took this data and classified the sites as to their correct phase(s) or subphase(s).

It now became apparent that some of the initial survey data was lacking certain information that we felt necessary for even a preliminary settlement pattern study, so we went back to the field. One obvious deficiency in our survey was Preceramic sites, so the senior author, who had some skill in reconnaissance in that realm, spent a couple of weeks in the field and found 20, raising our total site count to 390. The second lacuna in our data was specialized sites concerned with water control. R. Woodbury and J. Neely, the junior author, spent about four months finding these types of sites, raising our count to 456. The third lack concerned the recording and mapping of the sites themselves, for it was just not detailed enough to give vital information on number of structures, types of structures, or arrangement of structures. Therefore, MacNeish and Neely went over the survey notes and selected out eight to ten sites with a considerable range of settlement features for each of the ceramic subphases (Purron and Ajalpan excepted) for detailed mapping and study. Thus, Neely, accompanied by Narciso Tejeda and Francisco Molina, took off again for the field to map these fifty or so sites by Brunton compass.

The Settlement Pattern Study

Now we felt we had enough data to begin an analysis to establish settlement pattern types and this, in the main, took place in the years after we left the Tehuacan Valley. This establishment of settlement pattern types was basic to the understanding of any establishment of community types, with their obvious implications concerning changes in various aspects of the social organization. Therefore, it is necessary for us to describe how these types were arrived at before we present the raw data describing the sites and settle-

ment pattern phase by phase in the main body of this chapter, or the social implications of community types in the summary Chapter 8.

We felt that our settlement pattern types should be a correlation of five kinds of survey data that change through time: (1) the ecological and geographical (often topographic) location of our sites; (2) the permanency of occupation; that is, were the sites sedentary, representing one occupation of a single location by a group for all seasons for a series of years, or were the sites seasonal, with occupations during a season or seasons of but a single year; (3) the kinds of structures or lack of structures that occurred at each site; (4) the arrangement and relationships of these structures to each other; and (5) the type and size of the settlements.

Location of Sites

Before considering where the sites were located, period by period, let us briefly review our five environmental zones, or micro-environments, emphasizing their various subdivisions and the potential of each. These are, of course, treated more extensively in Chapters 2-6.

(1) *The El Riego Oasis*. This is a very small zone surrounded by the travertine beds of the western slopes. It is on the eastern cliffs of the Cerro de las Mesas, just north of the town of Tehuacan and from whence flow the famous Tehuacan waters. Because of these springs at the base of the cliffs, the adjacent alluvial soils are covered with a lush vegetation housing a wide variety of animals. Because of its size it would not have supported very many people at any time. Potentially, it would yield foodstuffs at all seasons of the year, but, due to the fact that much of the valley will not support populations during the dry seasons, those were the seasons when the Oasis was a particularly desirable locale.

(2) *The Travertine Slopes*. This area of barren soils is in the northwest corner of the valley, roughly from just west of Tehuacan itself, into the Zapotitlan Valley to the west, and southeastward along the western flank of the valley to the north bank of the Rio Calapilla. Only the wetter canyon bottoms (subdivision *a*) are very inviting, for here alluvial soils support cactus, mesquite, *Agave*, and grasses, as well as animal life, during the wet seasons when water actually appears in the arroyos. The other three subdivisions, the valley slopes (*b*), the hill flanks (*c*), and the hilltops (*d*), all have limited soils and xerophytic vegetation and few animals, but are livable during the wet seasons when

cactus yields fruit and animals move into the area. However, these divisions have other virtues, for there are deposits of salt, onyx, and flint, as well as stone that can be used for construction, and salt springs. Further, the easily defendable hilltops are strategic as military positions.

(3) *The Valley Center Steppe*. A relatively flat plain extends down the center of the valley from the travertine slopes and the Rio Zapotitlan in the west to the alluvial slopes in the east. These plains slope gradually northwest to southeast (1600 to 1000 meters) and are punctuated by three steps, marked by cliffs on steep slopes, which occur roughly at the southern limits of the town of Tehuacan, just above San Andrés and Chalma, and just to the north of Altepexi and Chilac. The area is literally the plains just to the east and west of our one major permanent river, the Rio Salado. The river bed itself, as well as its flanks with alluvial soils, is an obvious subdivision, called the humid river bottoms (*a*), of the larger environmental zone. Here are faunal resources that don't occur elsewhere—turtles, snakes, raccoons, ducks, cranes, fish—and a gallery forest that includes such distinctive plants as palms, cane, and fruit trees. Although this locality yields foods in all seasons, in the winter are concentrations of animals, fowl, and fish, as well as green vegetal foods, when food is scarce in most of the rest of the valley (El Riego excepted). Surrounding this subdivision are the flat steppes with their travertine-impregnated soils (subdivision *b*), within which mesas or erosional remnants compose the other two subdivisions of the zone, the hill flanks (*c*) and the hilltops (*d*). Vegetational cover here is mainly of grasses, *Setaria*, amaranth, and *Acacia*, with some mesquite trees, particularly in the latter two subdivisions. These plants yield food in the spring and/or summer of the year, and game becomes relatively abundant in the wet seasons. Further, salt may be extracted from the soils. The mesas have rock for construction and are, of course, defensible spots.

Various studies in the Tehuacan Valley indicate that there is a basis for establishing one other subdivision for this zone, but it is a chronological one, not geographic. These studies show what seems to have been one major climatic shift during the last 12,000 years, coming at the end of the Pleistocene. Dates from just north of Ajalpan on "older Breccia fill" of the last terrace and, we might add, on extinct animals in this fill, are 15,550 B.C. \pm 320 (I-4602), 8100 B.C. \pm 150 (I-4800), and 7800 B.C. (I-40) (I-4597). Our data from excavation in the Tehuacan Valley, as well as from Valsequillo near Puebla and from Naquita Cave of Oaxaca, in-

dicates that modern fauna had replaced extinct fauna by about 7400 B.C. This suggests that the transition from Pleistocene to Recent took place between 7800 and 7400 B.C. in the Tehuacan Valley. Byers' studies of climate suggest that the Pleistocene, while it might have had slightly moister conditions than at present, definitely had less differentiated seasons and cooler conditions. This means more severe winter frosts in the Tehuacan Valley. This has important vegetational implications for the valley, for many of the cacti, *Agave*, and other desert plants could not have existed. Probably those micro-environs that now have such vegetation were then occupied by a much expanded grassland, called here the *Pleistocene Grasslands* micro-environment (6). This conclusion is confirmed by Flannery's studies of fauna of the Late Pleistocene Ajuereado levels in Coxcatlan Cave, now in the thorn forest micro-environs. Here we found bones of jack rabbit, antelope, and horse, all grassland animals, indicating the grassland extended at least into that zone and that the thorn forest was then a very much smaller zone than it is at present. Further, it indicates that during the Pleistocene the dominant fauna in the extended Valley Center were herd animals and not individually moving desert animals. Other studies also indicate that probably mammoth and giant turtle lived in the expanded Humid River Bottoms zone. Thus we had an early micro-environment that included not only the present Valley Center Steppe zone, but much of the present-day Alluvial Slopes zone as well.

(4) *The Alluvial Slopes*. This micro-environment covers much of the eastern slopes of the valley as well as the south slopes west of the Rio Salado and the northwest corner of the valley north of the Travertine Slopes zone. This region, in terms of vegetation, is characterized by thorn forest, with a distinctive set of animals adapted to such a vegetation; but even this complex is far from uniform. Cutting through the slopes are a series of arroyos that have lush vegetation and many animals, mainly during the wet season; these make up the canyon bottoms subdivision (*a*) of the zone. The slopes or valley flanks themselves make up another subdivision (*b*), but even this changes gradually as one ascends the slopes to find more fruit trees at higher elevations, and, still higher up, a gradual blending-in of oak and pine forest with different soils and greater rainfall. Much of this zone is fairly rugged country and the hilltops (*d*) and hill flanks (*c*) compose still other subdivisions within it. Generally speaking, this zone has its maximum food potential in the wet season, but many of its fruits at higher elevations ripen in the fall.

(5) *The Canyons and Dissected Alluvial Slopes*. This final environment zone, or micro-environment, might well be considered a subdivision of Zone 4 and occurs within it in the southeastern portion of the Tehuacan Valley. The most distinctive subdivision is the bottoms of canyons (*a*) with alluvial soils and thick vegetation like the thorn forest. These soils cut through the eroded slopes, causing a series of mesas or small penepains with more xerophytic vegetation and even less game. These compose the other two subdivisions, the hill flanks (*b*) and the hilltops (*c*). Food resources are available mainly during the wet season, but in the late part of winter there is pochote fruit, and during the dry season animals "hide out" in the zone.

Thus we have a series of micro-environments with distinctive subdivisions in each, and our study of sites through time indicates that different zones were utilized at different times (see Table 14). In the earliest period, Ajuereado, two kinds of zones were primarily utilized, a flank zone including the Pleistocene grasslands and the valley flanks subdivision of the Alluvial Slopes, and a watered zone, including the El Riego Oasis, the canyon bottoms of the Travertine Slopes, and the humid river bottoms of the Valley Center Steppe.

A second period appears to last throughout El Riego, Coxcatlan, and Abejas times. Waterway situations are increasingly utilized throughout the period, with a noticeable increase in the use of another component, the canyon bottoms of the Canyons and Dissected Alluvial Slopes micro-environment. This second period, then, is only slightly different from the previous one, though we see the valley flanks of the alluvial slopes are now much exploited, the grassland steppe is now gone, or abandoned, and there is some use of a new zone, the slopes subdivision of the Travertine Slopes micro-environment.

The next period, roughly Ajalpan and Early and Late Santa Maria (and probably Purron), sees a very different pattern. The majority of sites now occur along two kinds of waterways; permanent ones, such as the humid river bottoms of the Valley Center Steppe, and seasonal ones, such as the canyon bottoms of the Dissected Alluvial Slopes. The obvious predominance in the use of these zones (we include the sites in the grasslands of the valley steppes in Santa Maria, which may reflect the use of irrigation canals) is further evidence that people preferred to live along waterways, albeit artificially made ones.

The Palo Blanco Phase reveals a tremendous change in settlement location. Twice as many micro-environs

TABLE 14
Sequence of Sites in their Environmental Zones

	Ajuereado	El Riego	Coxcatlan	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada	TOTAL
(3) Valley Center Steppe (c)hill flanks										2	5	4	11
(4) Alluvial Slopes (a)arroyo flanks									6	10	10	4	30
(4) Alluvial Slopes (c)hill flanks								2		10	14	17	43
(5) Canyons and Dissected Alluvial Slopes (b)hill flanks								1	2	5	8	7	23
(5) Canyons and Dissected Alluvial Slopes (c)hilltops								3	16	15	14	10	58
(4) Alluvial Slopes (d)hilltops								4	34	30	47	40	155
(3) Valley Center Steppe (d)hilltops									13	13	21	12	59
(2) Travertine Slopes (c)hill flanks								1	5	21	15	21	63
(3) Valley Center Steppe (b)steppes							2	14	12	32	41	46	147
(2) Travertine Slopes (b)slopes			4	1				1	9	10	13	15	53
(5) Canyons and Dissected Alluvial Slopes (a)canyon flanks		10	5	10	4	2	9	9	11	8	2	2	72
(4) Alluvial Slopes (b)valley flanks	6	15	3	6			1	4	5	4	6	4	54
(3) Valley Center Steppe (a)humid river flanks	2	2	3	3		13	20	7	2	2	6	3	63
(2) Travertine Slopes (d)hilltops	2		1	1				2	7	13	14	16	56
(2) Travertine Slopes (a)arroyo flanks	3	12	5	7		1		2	2	17	16	2	67
(1) El Riego Oasis	2	2	2	2					3	7	7	8	33
(6) Pleistocene Grasslands	4												4
TOTAL OCCUPATIONS	19	41	23	30	4	16	32	50	127	198	239	211	991

ments were being utilized with almost half of the Palo Blanco sites on hilltops in all of the larger micro-environments, a situation totally absent in the previous stage. In the final period, represented by the two sub-phases of Venta Salada, the change in residence location is less radical than that in Palo Blanco, but still there are differences. Now every one of our micro-environments and all but one of their subdivisions are utilized. Hilltop sites are still the dominant living areas chosen, but they have diminished in importance, while hill flank residential sites, relatively rare previously, now number 48. Further, if non-residential specialized sites, such as field border and hillside terracing sites of Late Venta Salada, had been utilized in our sample, the number of sites on hill flanks would be doubled. All in all, site locations show definite trends in time and are good time markers, or modes, and must be elements included in any settlement pattern types.

Permanency of Sites

Our evidence concerning permanency of sites reveals equally good temporal trends. The two major categories of sites, seasonal ones and sedentary ones, show the two well-marked periods of the Preceramic and the Ceramic. The Preceramic includes only 3 sites having possible permanent occupation and 108 of a temporary nature. The Ceramic Period has 308 sites of sedentary occupations and only 86 seasonal ones (see Table 16). However, thanks to the excellent preservation of flora and fauna and the acute studies of them by our specialists, the temporary or seasonal sites may be even further subdivided, so that the grosser, Preceramic Period may be classified in valid temporal units. Since this type of study of seasonality is almost unique to the investigations in the Tehuacan Valley, and since the studies have important implications necessary for the understanding of how agriculture began, it seems worthwhile to describe in some detail how this analysis was undertaken.

Almost from the outset of our excavations, we were made aware of the possibility of seasonality studies, for comments made by local workers during the initial weeks of digging in Coxcatlan indicated that various floors contained different seasonal plants. After discussing this for some time, we commissioned our ethnologist, Carmen Cook de Leonard, to collect information on the matter. She interviewed a very intelligent informant from Coxcatlan who knew well the thorn forest and dissected canyon region. Then, she collected information from a hermit witch doctor who lived off the land in the El Riego Oasis and Travertine Slopes regions. Later, she collected information from her ce-

ramic informants about the seasonality of plants in Altépexi (Valley Center zone) and, finally, she checked throughout the year when plant foods appeared in the Tehuacan market, the commercial center for the whole valley. Her lists of when and where plants became edible was checked by C. Earl Smith when he made his botanical collections. Also, Kent Flannery, at the time he gathered his zoological collections, made a very conscious effort to collect seasonality data about the animals of the valley. The next step in the analysis of this data came at a special conference following the field seasons, when three botanists, Eric O. Callen, Lawrence Kaplan, and Earl Smith, a zoologist, Kent Flannery, and MacNeish as the archaeologist representing the ethnologist, coordinated this seasonal information.

Two facts became immediately apparent. One was that complexes of plants became edible in definite seasons, which reflected the seasonal rainfall pattern of the valley (Table 15). The fall season (October, November, and December), when the rains were rapidly diminishing, is followed by the winter season (January, February, and March) when almost no rain falls. These were easily distinguished from the two wet seasons. One of these is in April, May, and June when rains increase to early June and then drop off between late June and early July. This delineates the spring season from the summer season when rains rapidly increase in late July and August and again fall off at the end of September. It was also discovered that the seasonality data differed qualitatively; that is, on the highest level, a series of highly probable seasonal indicators were not storable and had to be eaten only in one season, such as fruits, fish, and certain animals such as fetal peccary (*Pecari tajacu*) and deer (*Odocoileus virginianus*), as well as equally good indicators represented by hibernating animals such as lizards, snakes, and iguanas, or birds that seasonally migrate into the region, such as cranes, ducks, and geese. A second class of seasonal indicators were represented by plant seeds or animal remains (turtle or deer antler) that reached fruition during definite seasons of the year, but could be stored and held over into later seasons. The final group was the least reliable and was represented by artifacts that were used for specific seasonal plants but could be kept in storage after the season of the associated plants, or plants that reached fruition in a number of seasons, or negative factors, such as the feature showing the lack of specific seasonal indicators (Table 15).

Although our seasonal indicators found in excavation are graphically illustrated in Table 15, we believe they

TABLE 15
Seasonal Indicators in the Tehuacan Valley
(7400 B.C.-850 B.C.)

		FALL			WINTER			SPRING			SUMMER		
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
Rainfall in mm. (averages 1926-1955)													
Fall	CIRUELA FRUIT	=====										=====	
	AVOCADO FRUIT	==										=====	
	CHUPANDILLA FRUIT	=										=====	
	Bean seed	-										=====	
Summer	SAPOTE FRUIT										=====		
	FETAL DEER										=====		
	Squash fruit and seed										=====		
	Corn seed										=====		
Spring	Pepper seed										=====		
	FISH							=====					
	IGUANA, LIZARD, SNAKE							=====					
	Turtle							=====					
	digging sticks							-----					
	milling stones							-----					
	Amaranth seed									=====			
	Mesquite seed									=====			
	Grass seed									=====			
	Setaria seed									=====			
Winter	Leucaena seed									=====			
	Cardon seed									=====			
	NOPAL FRUIT							=====					
	Pochote seed							=====					
	TETECHO FRUIT							=====					
	DUCK, CRANE, GEESE							=====					
	nopal leaves							-----					
	scraper-planes							-----					
	Deer antler							=====					
	COYOL FRUIT							=====					
Fall	no milling stones							-----					
	no wet-season animals							-----					
	FETAL PECCARY							=====					
	COSAHUICO FRUIT							=====				=====	

deserve further comment. Peculiarly enough, our dire winter season has three very good indicators: tetecho fruits (*Cephalocereus hoppenstedtii*), coyol fruits (*Acrocomia mexicana*) from the river bottoms, and migratory fowl. Pochote seeds, pods, and cotton (*Ceiba parvifolia*) also occur at the end of this season and during April of the following season, as do deer antlers, but all of these could be kept over into later periods. Other indicators are most unreliable and, unfortunately, are mostly used for survey material. These include the presence of scraper-planes, and the lack of grinding-stones and wet-season animals. Nevertheless, there are some good dry winter indicators, contrasting with the wetter spring season, which heralds a burst of new life in the valley but has few first-class seasonal indicators. In the spring, grass seeds, cardon cactus seeds (*Lemaireocereus weberi*), *Leucaena* cactus seeds, *Setaria*, mesquite seeds and pods (*Prosopis juliflora*), and amaranth seeds (*Amaranthus* spp.) all reach fruition and become edible, but all are preservable and may be utilized in later seasons. Further, the reptiles, which are good wet-season indicators, occur at this time, but they are also just as good summer indicators as they are spring indicators. In fact, the only good spring indicators we have are *Opuntia* flowers, and even these, under special conditions, will fruit at other times. The other part of the wet season, the summer, is easier to identify, for chupandilla (*Cyrtocarpa procera*), sapote, and avocado fruit (*Persea americana*) occur only in this season, and ciruela plums (*Spondius mombin*) become edible at the end of this season or in the fall. Deer (*Odocoileus virginianus*) born during this period provided the deer fetus, also a good seasonal marker. The many other plants that reach summer fruition, such as corn (*Zea mays*), beans (*Phaseolus* spp.), squash (*Cucurbita* spp.), gourds, and chili peppers (*Capsicum annuum*) are also storable. The fall season is also difficult to identify; however peccary (*Pecari tajacu*) are born during this season and cosahuico and ciruela fruits, which cannot be stored, become edible. Based upon the assumption that our seasonal indicators were valid for past times, we literally enumerated the numbers of each of them that occurred in each floor or component. It immediately became apparent that those few excavated floors or components with architectural features, in such sites as Tr 204, Tr 367, Tr 368, Tr 218, Tr 62, and Tr 65, usually had seasonality indicators of all seasons and thus were sedentary occupations; i.e., occupations at all seasons of the year for a number of years. It was therefore assumed that all sites with architectural features probably were sedentary. This still left a large number of sites or compo-

nents, or even activity areas, without architectural features. A preliminary listing of the seasonal indicators for each revealed that most did not have indicators of probable occupation for every season of the year, so these were considered seasonal occupations. In the following sections giving the descriptions of each site, tables list the seasonal indicators for each component for each phase or subphase. This is the basis for showing that the different kinds of seasonality are good time markers, which we will briefly summarize here and in Table 16.

A study of the 19 Ajuereado sites indicated that only 5 of them were definitely occupied for but a single season and that the other 14 could only be classified as 5 general wet or 9 dry seasons. Activity Area C of Zone XXIV of Coxcatlan Cave (Tc 50) had lizard bones as well as deer fetus while the connected Area A had chupandilla and avocado pits, all excellent summer or fall season markers and ecofacts from no other season, so there is little doubt that this was in fact a brief summer-fall occupation. Activity Area B of Zone XXIV of the same cave had the spring indicator nopal fruit in it as well as *Setaria* seeds, grass seeds, and amaranth seeds, all storable food that reach fruition in the spring, as well as deer antler of the winter. Besides this good evidence of winter or spring occupation, Activity Area C of Zone XXIII with mesquite pods and grass and *Setaria* seed that fruit in spring and Zone XXVI of Tc 50 with grass seed, mesquite pods, turtle and lizards hint that they are only of this latter season. On a less secure basis are Activity Areas A and B of Zone XXIII of Tc 50 with winter deer antler, and the lack of grinding stones and other indicators of the preparation of wet seasons foods. The slim evidence from this component we have interpreted as indicating a winter season occupation. The other fourteen Ajuereado occupations had poorer evidence of seasonality, but there is some basis for classifying nine of them as of the dry season and five of the wet season. It might be added that thirteen of these components occupied small areas with thin layers of refuse, hinting that they, also, are of very brief periods; that is, only a part of the dry or the wet season.

This picture of all occupations being of a single season or less during Ajuereado times is in marked contrast with that of El Riego, which has many more seasonal indicators per floor. While there are again six single-season occupations, there are now five occupations of multi-seasons, two in the spring-summer-fall, one in the summer-fall-winter, and two of the summer-fall, as well as 28 that could be either single season or multi-season (estimated at 18 wet season and 10 dry

TABLE 16
Sequence of Seasonal and Sedentary Occupations

	Ajuereado	El Riego	Coxcatlan	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada
SEASONAL OCCUPATIONS												
All seasons				1						2	4	2
Multi-season (three)												
summer-fall-winter		1	1									
spring-summer-fall		2	2	2		1		1		3		
winter-spring-summer												
fall-winter-spring				2								
Multi-season (two)												
summer-fall		2			2		1	3	1	1	2	1
spring-summer			2		1	1			2	1	1	
winter-spring								1				
Possible single- or multi-season												
wet	5	18	9	9					1		1	3
dry	9	10	9	8				1?	9	15	5	7
Single-season												
wet { spring	2	4		2			1	1	3			
summer										1		
summer or fall	1											
dry { fall		1		2					5			
winter	1	1		1								
winter or spring	1											
Total Seasonal Occupations	19	39	23	27	3	2	2	7	21	25	13	13
SEDENTARY OCCUPATIONS												
				3		13	19	21	58	59	64	74
TOTAL RESIDENTIAL OCCUPATIONS	19	39	23	30	3	15	21	28	79	84	77	87

season). Coxcatlan continues this trend toward multi-season occupation. Apparently there are no components of a single season, but five are of multi-seasons. Although there are 18 sites that could be classified as either of the wet or the dry season, their size or the thickness of the floor hint that most of these too were multi-season occupations. The final period of the Preceramic, Abejas, shows a slightly different picture. Here there are five single-season occupations, five multi-season occupations, and, for the first time in our sequence, three sedentary occupations. Seventeen sites of either wet or dry seasons are probably all multi-seasonal. After this period, permanency of occupation does not seem to be a mark of the different time periods, because all now are overwhelmingly of sedentary occupations. However, be that as it may, the kinds of season occupation are good temporal modes for dividing the Preceramic.

Kinds of Structures

For dividing the Ceramic Period kinds of structures are good time markers. We have divided our study into two parts. One is concerned with residences, tying in with our previous section concerned with permanency of occupation, while the other concerns structures that are not lived in. Obviously, the division is somewhat arbitrary, for certain of our so-called residential structures may, in fact, have been used for storage, cooking, and a wide variety of activities other than living. Further, some of the pyramids may have served not only for ceremonial undertakings but for other more residential activities as well. Only excavation could really decide whether all these were in fact residences or not. Further, our study was incomplete, for our typology utilized not only the form of the structures, but also their type of architecture, construction, and number of

rooms, all of which were often not observable on the surface and could only be best understood by excavation, which we did not do. Thus, our study is of a most preliminary nature, but even so, good structure time markers are observable and more intensive survey can do nothing but add to them.

The earliest residential structures we have are unique to Abejas. Although only one of them was excavated, we would guess that all four found at three sites were the same—oval slab-lined pit houses. The next kind of structure occurs in Ajalpan and seems to have been some sort of small oval or rectangular house with wattle-and-daub walls. In our excavations of Ajalpan, Canoas, and Coatepec we found many chunks of burned wattle-and-daub, usually in direct association with ovoid or rectangular concentrations of artifacts, burned floors and hearth areas, and occasional post holes, but our excavations were neither extensive enough nor were they done with sufficient skill to really allow one to reliably reconstruct the house type. Be that as it may, many of the ill-defined remains of "houses" were uncovered on Ajalpan and Santa Maria floors, while such were only observed on a few Palo Blanco sites and none occurred associated with Venta Salada remains. The next type of structure that begins in Early Santa Maria is relatively small (2 by 4 to 4 by 8 meters) rectangular single-room structures with walls made of cut slabs set horizontally one on top of the other. These carry through Late Venta Salada times in increasing numbers. The only ones we encountered were in our excavations at Coatepec, and some of these had dry-wall construction, while others were cemented together with clay, with or without adobe slabs. Further, surface collection from Venta Salada examples revealed many with plastered walls and floors. Probably, future investigations will allow someone to subdivide our gross types into even finer time markers, but our preliminary endeavors in Tehuacan are justified. Equally ill-defined, and covering about the same time span, are small truncated pyramids composed of earth and surfaced with some stone, adobe, or special earth. Most examples of these are from survey and we only excavated a portion of one of these at Coatepec West where records were so poor that they are of little use in determining the type. We are sure that further archaeological endeavors giving more adequate attention to construction, secondary features (such as stairways, etc.), and any possible structures on the summits of these small pyramids will allow for a better typology and better information as to which of these were house platforms and which were non-residential ceremonial structures.

Starting in Late Santa Maria, but really characteristic of Palo Blanco, is a new type of residential structure with a series of boulders surrounding a small enclosed rectangular room. These reached their greatest popularity in Early Palo Blanco times and are closely related to foundations made of cut-stone blocks that are characteristic of Late Palo Blanco. Both, in turn, are closely related to long linear structures composed of a series of rectangular rooms outlined by boulders or blocks of stone that are usually associated with the central plaza of Palo Blanco sites. Again, none of these kinds of structures have been excavated, so reconstruction of their architectural features is difficult. However, the spacing between the rocks and the fact that some of the linear structures have double lines of stones suggest that these are footing for some sort of wall rather than parts of the first layering of a wall.

However, contemporaneous with these structures are truncated pyramids that have cut-stone blocks placed one on top of another. Many of these were in a fair state of preservation and had distinctive architectural features, such as a sloping wall placed below a vertical wall, a type of construction called talus-talud. These truncated pyramids had flat tops, usually with a structure, and stone steps, on one or more of these sites. In rare cases, a few structures of block construction had tiers of vertical faced steps on their sides and, as such, were stepped pyramids. Eleven occurred in Palo Blanco times; there also were six in Venta Salada.

Venta Salada, however, for the most part, has a whole new group of structures. Most common are linear structures with three to six adjacent square or rectangular rooms. The walls are usually made of cut slabs which seem to have been set on some sort of mortar fill or are stuck into mortar. Some of the better preserved examples of these structures had plastered surfaces and floors. A few had floors paved of stones. Closely related to this type is one we called rectangular multi-room slab-walled structure. In construction, these are much the same, but they are, for the most part, larger, with 4 to 10 rooms, and the rooms are around three or four sides of a patio area. These were separated from the other type because they did not become really popular until Late Venta Salada times. Accompanying them are steep-sided pyramids with slab set into internal mortar. These have inset steps on one or more sides, often with pilasters at their sides, and some give evidence of having been plaster-covered. Also, in this late period are a few similarly constructed pyramids which are conical in shape and a few in Late Venta Salada which are square in outline. These latter are often in the center of plaza areas.

TABLE 17
Sequence of Residential Structures

	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada
Square-based pyramids in centers of plazas									6
Circle-based pyramids								31	2
Rectangular steep pyramids with slab walls								110	141
Rectangular multi-room slab-walled structures								339	1129
Stepped pyramids						6	5	5	1
Talus-tabud block pyramids						197	107	90	
Linear multi-room foundations						7	24		
Rectangular single-room block foundations						679	889	169	27
Rectangular single-room boulder foundations						1200	703	18	15
Small truncated pyramids of earth and rock				8	35	44	145	150	250
Rectangular single-room slab-walled structures				6	12	42	3	345	1115
Wattle-and-daub houses		1?	13	11	19	?	?	?	
Oval slab-lined pit houses	3								
TOTAL	3	1?	13	25	66	2175	1876	1841	3796

Thus, the residential structure marks off the latest Preceramic phases from the Ceramic phases in a very definite manner, but so do many of the non-residential architectural structures or features often reflecting specialized activities (Table 18).

There are a whole host of features that are often associated with the actual residential structures themselves, and some are of a ceremonial nature. These include four kinds of ball courts: those with either a rectangular or an I-shaped floor plan (both dominant in Palo Blanco) and those formed by an oval depression or between two parallel mounds (mainly Venta Salada). This pattern closely simulates that of the plaza areas. Enclosed plazas are most popular in Palo Blanco, as are the causeway structures, while those plazas encompassed by parallel mounds are more prevalent in Venta Salada. U-shaped plazas, although they last through the whole sequence, seem more popular in latest Venta Salada.

One set of structures showing good chronology are those concerned with water or erosional control. Our earliest evidence of water control is, of course, the Purron Dam, discussed in Volume 4 of this series. It was first constructed in Early Santa Maria times, but other valley dams do last on into later phases. Another set of features of this kind are the terraces that begin in Early Palo Blanco and increase in number throughout the sequence. They have been divided rather arbitrarily into four varieties—residential plaza terraces,

occurring mainly in Palo Blanco, residential and agricultural hillside terraces that are very difficult to distinguish from each other and have roughly the same temporal distribution in Palo Blanco and Venta Salada, and agricultural valley terraces that occur mainly in Venta Salada, although six examples did occur in Late Palo Blanco. Large valley canals also have a late distribution.

Features connected with salt industry such as salt mounds, salt drying bins, salt canals, salt-filtering mounds, and salt dams are more popular in Venta Salada, but first occur in Palo Blanco. Quarry sites are also popular in late times, but there is some evidence to suggest they go well back into the Preceramic. Other features with obvious implications of specialized activities, fortification walls, shrines, plaster-lined pits (for bark cloth soaking?), and areas or sites with large amounts of ceramic molds are all confined to Venta Salada.

Another set of features concerned with burials has a long life span. Here our sample is extremely poor because, for political and public relations reasons, we purposely avoided digging burial sites. However, we do seem to have burial pits for bundle or cremation and extended from at least El Riego to Venta Salada times. A bell-shaped burial pit occurred at one Ajalpan component, and slab-lined burial pits occurred in Palo Blanco components. Appearing both in Palo Blanco and Venta Salada are burials in niches in caves as well

TABLE 18
Sequence of Features of Specialized Activities

	Ajuereado	El Riego	Coxcatlan	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada
Pottery-making sites (ceramic molds)												5
Bark cloth-making sites (bark cloth pits)											1	6
Shrine sites (xantiles)											6	17
Fortification sites											7	8
Flint-knapping sites (quarries)									2	6	3	9
Salt-making sites												
with dams									2	1	4	4
with cooking mounds									3	?	2	X
with canals									2		6	3
with bins									4	1	11	6
no. of bins									8	1	151	11
with mounds									10	7	25	24
no. of mounds									547	81	967	738
Water-control and agricultural features												
valley canals										2	2	3
valley agricultural terraces										6	3	7
hillside agricultural terraces									4	8	5	13
hillside residential terraces									20	20	24	222
plaza residential terraces									21	12	?	
check dams										2	12	6
valley dams							1	2	1	1		1
Recreation/religious features												
ball courts												
oval depression											2	
rectangular									2	1	?	
parallel mounds									4		6	5
I-shaped									10	5	2	1
Religious/administrative features												
monumental staircases											6	8
causeway structures								4	11	8	2	3
plazas												
enclosed								3	37	25	25	35
parallel							1	1	17	11	22	50
U-shaped							1	3	10	10	16	51
Burial features												
rectangular tombs											2	?
cave niche burials									2	9	?	3
cruciform tombs									2	2	1	1
slab-lined pits				3					2	4		
bell-shaped pits						1						
extended burials		4				5	1	8	X	2		
bundle or cremation burials		2	3	5							1	X
Household features												
altar fire pits												2
cache pits		4	1	1		5		1	3	2	2	4
fire pits		10	7	5	4	2		7	8	8		4
storage or refuse pits	1	6	3	6				4	5	8		1
roasting pits	1	4	3		1	6	6	3	6	3	10	
fired areas	1	6	16	9		2	3	1	2	3	?	3

as some sort of elaborate subterranean cruciform tombs. Finally, Venta Salada has examples of some sort of rectangular tomb. Undoubtedly, excavation would better define the various burial structures as well as find many new kinds, but even with our limited data there is good evidence of change through time.

The final set of features seemingly connected with household activities come mainly from excavation and have been described in the earlier chapters dealing with our excavated sites. These include altar fire pits, fire pits, roasting pits, fired areas, cache pits, and storage or refuse pits. Most of these occur throughout our sequence and our sample is not large enough to determine any definite temporal trends.

Settlement Types

The next logical step concerned the clusters of these various kinds of residential structures and their contemporaneous special features; that is, a study of the types of settlements. As we have seen, one obvious division of these residential units concerned whether they were of a temporary nature or relatively permanent, that is, seasonal camps or sedentary occupations. As mentioned previously, this presented problems, for all components did not have good seasonality indicators. We therefore made the assumption that those sites without architecture were camps, and that those with relatively permanent architecture were sedentary residential units. Our description and analysis of excavated sites in this volume indicates that this assumption does have some basis in fact. Other temporal problems were concerned with whether or not the clusters of structures or features were actually contemporaneous and did, in fact, represent an actual settlement. Here again, assuming that our artifact types were good time markers, we could further assume that our structures, features, or activity areas associated in space with the same congeries of types were in fact contemporaneous. We went one step further with the camps and assumed that, on a particular zone, the features or activity areas with the same seasonal indicators, as well as similar artifact types, belonged to the same occupation. Again, our excavations tend to confirm both these assumptions.

A second set of problems concerned the spatial definition of the settlements. Here we assumed that a continuous distribution in space of structures, features, and contemporaneous artifacts represents a single occupation by a group of people involved in "face-to-face" relationships; that is, a settlement. From a practical standpoint the problem was what is meant by continuous distribution or, to put it another way, how

big a break in the spatial distribution represents a discontinuity. Although we never formally stated it, the survey field notes seem to indicate that a break in the artifact distribution of 100 meters or more represented discontinuity, and the limits of a settlement. The validity of this assumption is extremely difficult to document, but its practicality in the field, to our minds, justified using the assumption.

Nevertheless, in spite of the various limitations and assumptions that had to be made about the settlements, we were able to classify our settlement units, or spatial clusters of contemporaneous artifacts, features, and structures, into types that marked off our time periods extremely well. Also, we might add that these types also had important implications concerning changing social relations. On the basis of size of the settlement and number of features (mainly hearths) it was possible to divide the camps, temporary or seasonal occupations, into two types that marked off the Preceramic into temporal periods. The smallest unit called a *Microband Camp* is a component that covers less than 80 to 400 square meters, averaging in the Preceramic about 50 square meters, with no more than two or three hearths. This was the only type found in Ajuereado and it diminished in importance throughout Preceramic times. Such sites were readily distinguishable in both excavation and survey. The second type is called a *Macroband Camp* and is characterized as having three or more hearth areas and covering more than 80 square meters. In the Preceramic none covered more than 60,000 square meters, and the average was about 7,000 square meters. Our excavated components with the prerequisite number of hearths and associated seasonal indicators presented no problems in identification as macroband camps, but surface sites, or those excavated sites without seasonality, required that we rely on size alone. This left much to be desired, for one could not really tell a series of overlapping microband camps of roughly the same phase from a single macroband occupation. Be that as it may, these large sites begin in El Riego times, become most popular in Coxcatlan, and seem to be on the wane in Abejas, and thus our macroband camp type is a useful Preceramic time marker.

Although Abejas is not readily distinguishable from Coxcatlan on the basis of camp sites, it is distinctive in having a new settlement type, the *Hamlet*. Further, hamlets are diagnostic of Ajalpan (and perhaps Purron), a major type in Santa Maria, but continue to be very popular even in Palo Blanco and Venta Salada times. Hamlets, although roughly of the same size as macroband camps, covering from 300 to 200,000 square

TABLE 19
Sequence of Settlement Types

	Ajuereado	El Riego	Coxcatlan	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada	TOTAL
City											1	3	4
Town								2	14	14	13	12	55
Village							10	13	23	25	18	19	108
Hamlet				3		13	9	6	21	20	32	40	144
Macroband Camp		9	13	12		1	1		2	5	1	4	48
Microband Camp	19	30	10	15	3	1	1	7	19	20	12	9	146
TOTAL	19	39	23	30	3	15	21	28	79	84	77	87	505

TABLE 20
Sequence of Settlement Arrangements

	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada
Diffuse with nested and diffuse plazas									3
Diffuse with plaza or mound						4	17	17	20
Diffuse with diffuse plazas						2	7	7	7
Diffuse without plaza or mound						7	9	15	29
Diffuse around nested plazas						5	3	4	6
Concentric without plazas						9	5	1	
Concentric with diffuse plazas						3			
Concentric with nested plazas					6	4	3	3	
Concentric with plaza or mound				3	5	14	9		1
Linear with plaza or mound				4	4	3			
Linear without plaza or mound	1		13	10	6	4	6	5	2
Total	1		13	17	21	55	59	52	68
Sites with unknown arrangement	2	1?		2		3		12	6
TOTAL SEDENTARY SITES	3	1?	13	19	21	58	59	64	74

meters and averaging about 15,000 square meters, do have definite living structures, indicating sedentary residences, but lack pyramids, plazas, or other structures indicative of a centralized authority or administrative unit. Our next settlement type, the *Village*, has a single group of such structures, usually with a plaza, indicating some sort of centralized authority as well as many living structures, and is only slightly larger in size, covering from 900 to 200,000 square meters, with an average of about 22,000 square meters. This type occurs first in Santa Maria times and is the

most popular settlement type at that time, gradually diminishing in the later periods. Our next type, designated as a *Town*, is noticeable in its size, ranging from 7,500 to 1,500,000 square meters, averaging about 230,000 square meters. It has two to four plaza areas surrounded by mounds or two to four groups of mounds. Besides these features indicating some sort of sacred or central authority, there seems to be a gradual gradation of structure from rather large pyramids to simple single-room houses. Although these begin in latest Santa Maria times, they are most popular in Palo

Blanco with only a slight decrease in Venta Salada times. Four Venta Salada sites are considered to be *Cities*. These are not difficult to distinguish from towns. Furthermore, there simply never was enough time or money to adequately map or study them. All four are huge in size, ranging from 600,000 to over 2,000,000 sq. meters, averaging about 1,400,000, and as such are much larger than towns. Like towns, our cities have several plaza areas, but they seem to be more numerous and to be hierarchical in size and importance. Both towns and cities seem to have a hierarchy of residential structures, but, from our very superficial observations, cities seem to be segmented into barrios, many of which appear to house full-time specialists, not just farming folk. This should be the key criteria for defining cities; that is, a settlement where the majority of the inhabitants were full-time specialists, not directly involved in agricultural activities. Our four cities seem to have this type of population, but only a thorough excavation program can really determine if such is correct. Regardless of whether they are true cities or not, one can safely state that Venta Salada is distinctive in having four huge sites, of a type unlike any in the previous periods. (See Table 19.)

Settlement Arrangements

Another criteria for determining settlement pattern types, that is, the arrangement and relationships of structures within the sedentary sites, showed good temporal modes. Because of our excavations in Coatepec where there seemed to be houses arranged in a line, and because of our knowledge of Palo Blanco times when houses were arranged more or less in circles around nuclear plaza areas, we first talked of arrangements as simply being linear, concentric, or diffuse. Although such categories revealed definite trends, we were not completely satisfied because we felt these arrangements were primarily due to the topography selected in the last four subphases. When James Neely began mapping the larger Palo Blanco and Venta Salada sites, structure arrangements clearly showed differences through time, which were not due just to topography, but to seemingly cultural factors, such as the relationships of plazas to each other, as well as the relationships of residential structures to the various kinds of plazas with their mounds. In Abejas and Ajalpan there seems to be only an arrangement of residential structures (houses) in linear fashion. This practice continued into Santa Maria times, but some linear sites now had house structures associated with a mound or mound group, and, furthermore, some sites had mounds in the center of the houses and refuse

areas. These concentric patterns seemed to occur for cultural reasons, because they, like the linear ones, were, in the main, in similar topographic positions. In Palo Blanco the linear pattern was seldom used and the concentric and diffuse patterns were preferred. Many of these concentrically arranged sites were on hills, but some sites on hills were arranged in a diffuse manner with or without clustered or nucleated plaza areas. This diffuse pattern became dominant in Venta Salada, although a few large sites with structures encircling clustered plazas occurred in Early Venta Salada. The diffuse sites in Venta Salada occurred not only on hills, but also on hill or valley flanks, and this included almost all the smaller sites without mounds or those village sites with but a single mound or mound group. Further, by Late Venta Salada times clustered plaza areas or mound groups found in the large diffuse sites were not located in the more logical central position. (See Table 20.)

Settlement Pattern Types

Each of the above factors in our settlement pattern study revealed attributes within each class that had definite temporal significance, and as such were diagnostic of certain time periods. In other words, settlement pattern modes were established in regard to the location of the sites, their permanency or lack thereof, the kinds of structural features found at the sites and the arrangement of them, the type of sites, and their size. Therefore, the next step in our study was to see if these modes clustered into settlement pattern types that marked off our time periods more clearly than the individual modes themselves. On the earliest Pre-ceramic level, only three classes of features had to be considered; the environmental factors, the seasonality or permanency of the occupation, and the kind of settlement, since there were no structures and, of course, no structure arrangements. One of our earliest settlement pattern types, occurring in significant proportions only in Ajuereado and El Riego, were micro-band camps of limited duration in the dry season at permanent water sources. A closely related type, micro-band camps of the dry season in a wide variety of environments, usually without permanent water, had a rather different temporal distribution, for, while these were important in Ajuereado and El Riego, they continued to appear in some amounts in later phases. Both of these contrasted with microband wet season camps in numerous environments throughout our sequence. While this type was important in Ajuereado, it reached its maximum popularity in El Riego and then gradually became less utilized. Closely related is another micro-

TABLE 21
Sequence of Settlement Pattern Types

	Ajuereado	El Riego	Coxcatlan	Abejas	Purron	Ajalpan	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada	Total
Flank city												2	2
Fortified city											1?	1	2
Pottery hamlet												3	3
Hill flank town											1	4	5
Knapping hamlet											1	6	7
Guard house hamlet											1	3	4
Fortified village											2?	4	6
Fortified hilltop town											3	3	6
Diffuse flank village										2	4	7	13
Diffuse valley village										7	3	2	12
Diffuse valley town										4	2		6
Hill flank hamlet									2	6	6	14	28
Salt hamlet									3	2	11	6	22
Diffuse hilltop village									10	6	9	5	30
Diffuse hilltop town									5	3	2	4	14
Nuclear hilltop village									12	6		1	19
Hilltop hamlet									14	9	8	3	34
Nuclear hilltop town									6	5	4		15
Nuclear steppe town								2	3	2	1	1	9
Nuclear (valley) village							3	9	1	4			17
Linear (waterway) village							7	4					11
(Linear) waterway hamlet				3		13	9	6	2	3	5	5	46
Macroband dry-season camp			4	2								1	7
Macroband multi-season camp		3	2	3		1	1			5	1	2	18
Macroband wet-season camp		6	7	7					2			1	23
Microband multi-season camp		2	1	2	3	1		5	3	5	6	1	29
Microband wet-season camp	8	16	4	4			1	1	2	1	1	2	40
Microband dry-season camp	6	6	2	8				1	12	11	4	5	55
Microband dry-season water-source camp	5	6	3	1					2	3	1	1	22
Total settlement types	19	39	23	30	3	15	21	28	79	84	77	87	505
Total indeterminate occupations		2			1	1	10	21	40	105	141	103	424
Total specialized sites									8	10	21	21	60
Total unclassified sites							1	1					2
GRAND TOTAL OCCUPATIONS	19	41	23	30	4	16	32	50	127	199	239	211	991

band camp which also occurs in a wide variety of environments, but has a new characteristic in terms of its seasonality in that it occurs in two seasons, one of which is during the wet part of the year and the other during the dry, or in three seasons of the year. This type starts in El Riego, and continues with some popularity into Coxcatlan, but lasts into the later part of the sequence.

The next three types are all macroband camps, but have slightly different temporal distributions as well as other features that make them good time markers. One type, which is equally popular in El Riego, Coxcatlan, and Abejas, has evidence of multi-season occupation

in a wide variety of environments. This type is much like another where macroband camps are occupying many environments during the wet season or seasons. This type is more popular in Coxcatlan times, although it occurs in both El Riego and Abejas. The other type of macroband camp is very different from the other two in that it occurs only in open sites in the dry season, often in the travertine slopes area, mainly in Coxcatlan and Abejas times. Thus, our seven temporary occupation types are good time markers for the Pre-ceramic and give each of our four earliest phases distinctive congeries of settlement pattern types. Ajuereado has only microband camps of single seasons.

The dominant type is the wet-season camp in multi-environments; dry-season camps along waterways is distinctive for the period, while dry-season camps in non-waterway environs also occur. These three types continue into El Riego times; multi-season microband and macroband camps now occur, as well as some wet-season macroband camps. In Coxcatlan we see the decrease of the microband types of Ajuereado, the same additional types of El Riego, with multi-season microband camps reaching their maximum popularity and the addition of a new type, macroband dry-season open camps. Abejas is much like Coxcatlan, but the occurrence of our first sedentary occupation type, the waterway hamlet, gives it its distinctive air.

The rest of the sequence is marked off by a series of sedentary types of occupations in which all five classes of settlement pattern features must be taken into consideration. Ajalpan (and probably Purron) is characterized by sedentary hamlets along waterways, all seemingly with houses in a linear arrangement. This type is also very popular in Santa Maria and lasts through the rest of the sequence in diminishing proportions. This hamlet settlement pattern type probably could have been further subdivided on the basis of architectural features, but our limited survey data did not allow us to do such. Nuclear (valley) villages and waterway villages give Santa Maria its distinctive complex for both these types die out in Palo Blanco. Late Santa Maria differs from the earlier part of the phase in having a nuclear steppe town and more nuclear valley villages.

The last two phases are represented by many more components than the earlier ones and therefore have many more settlement pattern types. One of the most distinctive aspects of Palo Blanco peoples was their preference for placing their permanent settlements on hilltops in every environmental niche. Different settlement types and the slightly different structures and arrangements thereof, as well as different temporal distribution, justify our further dividing these hilltop types. Nuclear hilltop villages occur almost exclusively in Palo Blanco times; nuclear hilltop towns are mainly in Palo Blanco, although a few occur in Early Venta Salada. Hilltop hamlets, however, although more popular in Palo Blanco, last on into Late Venta Salada. Diffuse hilltop towns and diffuse hilltop villages are, however, about as popular in Venta Salada as in Palo Blanco. Again, however, the type of construction of structures in Palo Blanco and Venta Salada seem different and may in the future be the basis for further subdividing the five hilltop types, but as of now our data is just not complete enough to allow us to do it.

Two other types start in Early Palo Blanco, salt hamlets and hill flank hamlets; both are more popular in Venta Salada, with the latter not really being very numerous until Late Venta Salada. Two types which do not occur until Late Palo Blanco are most popular at that time. These are diffuse valley towns and diffuse valley villages. Only the latter makes it into latest Venta Salada times. A very similar type, the diffuse hill flank village, is slightly different in its temporal distribution than the other diffuse types in that it first occurs in Late Palo Blanco and becomes most popular in Late Venta Salada, as does the hill flank hamlet mentioned above.

Venta Salada sees a host of new types represented by rather limited examples. Three fortified hilltop towns and a single fortified hilltop city occur in both Early and Late Venta Salada. Four rather poorly defined types: fortified villages, fortified hamlets or guardhouses, hill flank towns, and knapping hamlets all first occur in Early Venta Salada, but became more popular later. Only pottery hamlets and flank cities are distinctive for Late Venta Salada.

One major difficulty of our survey data was that on many (505) of the above classified settlement sites there were a few sherds of other periods representing other indeterminate occupations. Only when sherds on earlier sites were of xantiles, probably of Late Venta Salada times, did we even attempt to guess when these minor occupations might have been. These sites we very tentatively classified as shrine sites and seem to be a good time marker for Late Venta Salada. Other specialized sites without settled occupations proved to be good time markers. A number of such sites represented by salt mounds or salt production features, gradually increased from Early Palo Blanco through Late Venta Salada. In the same class as these salt production sites were sites concerned with water control, such as dams, canals, and valley and hillside terracing. These again marked off our later subphases, but without evidence of definite occupation. Besides all these sites there were, of course, a few with residential structures or specialized features that did not have enough sherds to be classified into phases or subphases. These we have merely listed with a comment following the next sections.

However, in spite of the limitation of survey data, and in spite of insufficient excavation revealing details of architectural construction, both our settlement types and even our kinds of specialized sites, are entirely good time markers. In the following sections we shall briefly describe each of them, chart their salient settlement features and plot their distribution. In these sec-

TABLE 22
Sequence of Sites with Specialized Features

	Early Santa Maria	Late Santa Maria	Early Palo Blanco	Late Palo Blanco	Early Venta Salada	Late Venta Salada
Shrines					6	17
Quarries			2	6	3	9
Canals				2	2	3
Valley agricultural terraces				7	3	7
Salt industry sites			7	7	14	16
Hillside agricultural terraces			4	8	2	13
Dams	1	2	1	3	12	6
TOTAL	1	2	14	33	42	71

tions the maps of settlement pattern types by phase or subphase reveal one additional significant set of information that did not concern us in our initial classification for temporal types. That is, the sites of various of our phases or subphases seem to cluster into discrete geographical units. Because our sample of survey sites is extremely large, and since our reconnaissance was done in an objective random manner, we believe these clusterings are not due to chance, but have social significance. Thus, we have come to the conclusion that the groupings of settlements represent *Communities*, that is, "the largest grouping of persons in any particular culture whose normal activities bind them together into a self-conscious corporate unit, which is economically self-sufficient and politically independent" (Wauchope, 1956). Our sequence of community types,

as well as some settlement types themselves, have broad implications about cultural or social evolution. Further, these wider implications are interconnected with the whole knotty problem of the relationship of settlement pattern, demography and populations, and cultural change. All these more speculative matters we shall discuss in the last chapter, and after we have presented the more factual data about settlements.

Unclassified Sites

Sites with irrigation features but no identifiable sherds are *Tr* 86, *Tr* 93, *Tr* 325, *Tr* 331, *Tr* 353, *Tr* 360, *Tr* 361, *Tr* 362, *Tr* 395, *Tr* 396, *Tr* 397, *Tr* 398, *Tr* 399, *Tr* 400, *Tr* 401, *Tr* 402, *Tr* 403, *Tr* 406, *Tr* 407, *Tr* 408, *Tr* 409, *Tr* 410, *Tr* 425, *Tr* 426, *Tr* 427, *Tr* 428, *Tr* 429, *Tr* 430, *Tr* 431, *Tr* 432, *Tr* 433, *Tr* 434, *Tr* 436, *Tr* 437, *Tr* 438, *Tr* 439, *Tr* 440, *Tr* 441, *Tr* 442, *Tr* 443, *Tr* 444, *Tr* 445, *Tr* 446, *Tr* 448, and *Tr* 456.

Salt mounds without identifiable sherds are *Tr* 54, *Tr* 164, and *Tr* 277.

Open sites with chips but no identifiable artifacts are *Tr* 27, *Ts* 112, *Ts* 203, *Ts* 250, and *Ts* 378.

Caves with chips but no identifiable artifacts are *Tc* 29, *Tc* 60, *Tc* 61, *Tc* 114, *Tc* 136, *Tc* 137, *Tc* 138, *Tc* 149, *Tc* 150, *Tc* 259, *Tc* 262, *Tc* 263, *Tc* 264, *Tc* 265, *Tc* 266, *Tc* 267, *Tc* 268, and *Tc* 269.

Border Sites

Tr 40 is at San Hipolito, Puebla, and its sherds indicate it belongs to non-Tehuacan ceramic phases.

Tr 47 is near Tequistepec, Oaxaca, and contained mainly Thin Orange sherds indicating it is west of the border of Palo Blanco.

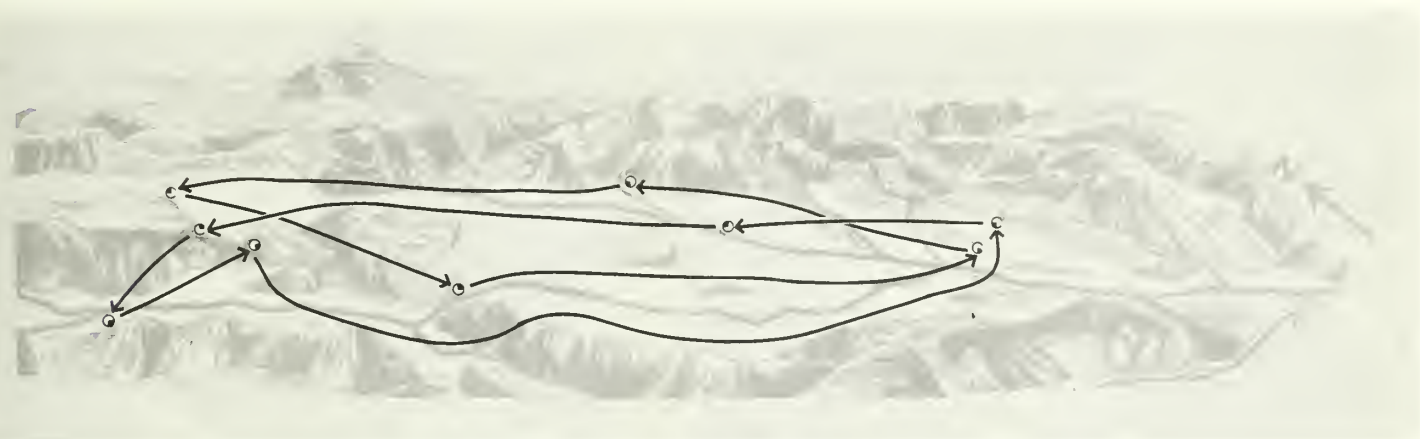


Fig. 141. The reconstructed Ajuereado settlement pattern in the Tehuacan Valley.

The Ajuereado Settlement Pattern

Of the eighteen, or possibly nineteen, components of the Ajuereado Phase, only five, all from excavation, can definitely be classified as single occupations. These are: Layer 6 of El Riego Cave (Tc 35), a small floor of less than 40 square meters around a single roasting pit; Area C of Zone XXIII in Coxcatlan Cave (Tc 50), about 30 square meters with a single storage pit; Areas A and B of Zone XXIII, about 27 square meters with a single fired area; also Areas A and C of Zone XXIV of Tc 50, covering 23 square meters; and Area B of Zone XXIV, about 12 square meters. There can be little doubt that these occupations were laid down by small groups; perhaps they were microband home-base camps, for a full range of activities were represented in the artifact congeries. Probably all of them were of family size or smaller. The other Ajuereado components from Coxcatlan Cave, Zones XXVIII, XXVII, XXVI, and XXV, were relatively thick strata and could not be considered true living floors, in spite of the fact that all contained wet-season animal bones. Regardless of how many actual occupations these earlier zones may have contained, they uniformly covered small areas and must be considered either microband occupations, that is, occupations composed of one or more individuals carrying on specific activities in groups of less than three or four nuclear families with linked individuals, or task group occupations. This is also true for three of the surface sites, Ts 383, Ts 372, and Ts 500. While we cannot tell whether or not they were reoccupied, their relative sizes—180 square meters, 800 square meters, and 750 square meters—along with their artifact congeries representing a full range of ac-

tivities, place them in the microband class. Using the Bushman proportions of one person per 20 square meters of refuse, they could not have been larger than 9, 40, and 38 individuals, respectively.

The types of settlement of the remaining sites are impossible to determine. Our evidence of occupations in Tc 391 and Tc 39 came from only a few Ajuereado tools in the lower levels of test excavations, in no discernible strata. Evidence of Ajuereado occupation in Ts 204, Ts 368, Ts 343, and Ts 380 was also slight—a few early tools amongst collections containing artifacts of many phases.

A small lower zone (C) of Tecorral Cave, because of extinct turtle and antelope bones found there, has been mentioned as a possible Ajuereado component. In sum, our meager evidence suggests that all Ajuereado occupations were by task groups or microbands, perhaps ranging from one to forty people.

On the basis of only five definite occupations and twelve other possible occupations, any attempt to arrive at exact population figures for a phase as long as Ajuereado, which covered perhaps four or five millennia, is obviously pure folly. Perhaps the only quantitative figures worthy of mention are from the ten components that lacked extinct animal bones, and that probably were occupied from 7600 to 6800 B.C.; that is, sites Ts 500, Ts 383, Ts 372, Layer 6 of Tc 35, Activity Area C of Zone XXIII, Areas A and B of that zone, and from Zone XXIV of Tc 50, Area B, and Areas A and C. All told, these occupations covered only 1,862 square meters during this 800-year period, or about 235 square meters per century. However, we can say with some

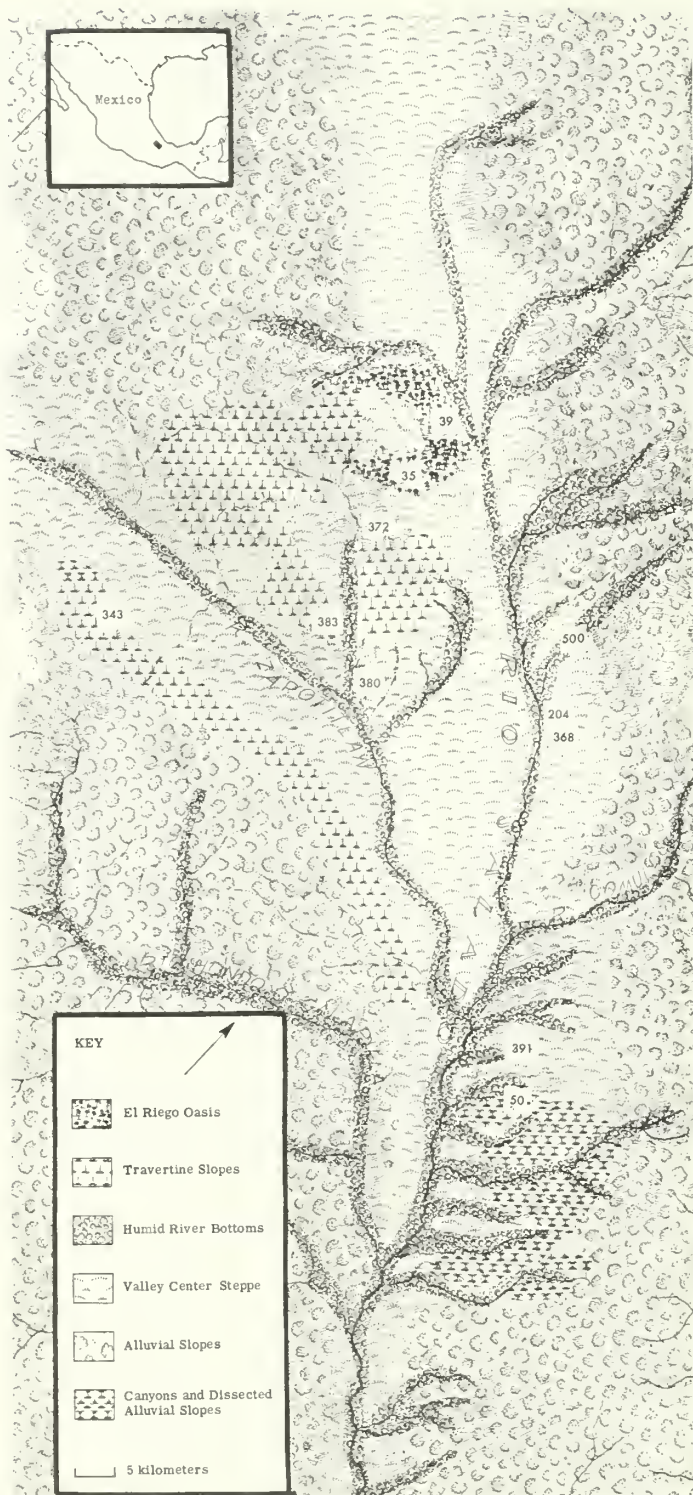


Fig. 142. An ecozone map of numbered Ajuereado sites in the Tehuacan Valley.

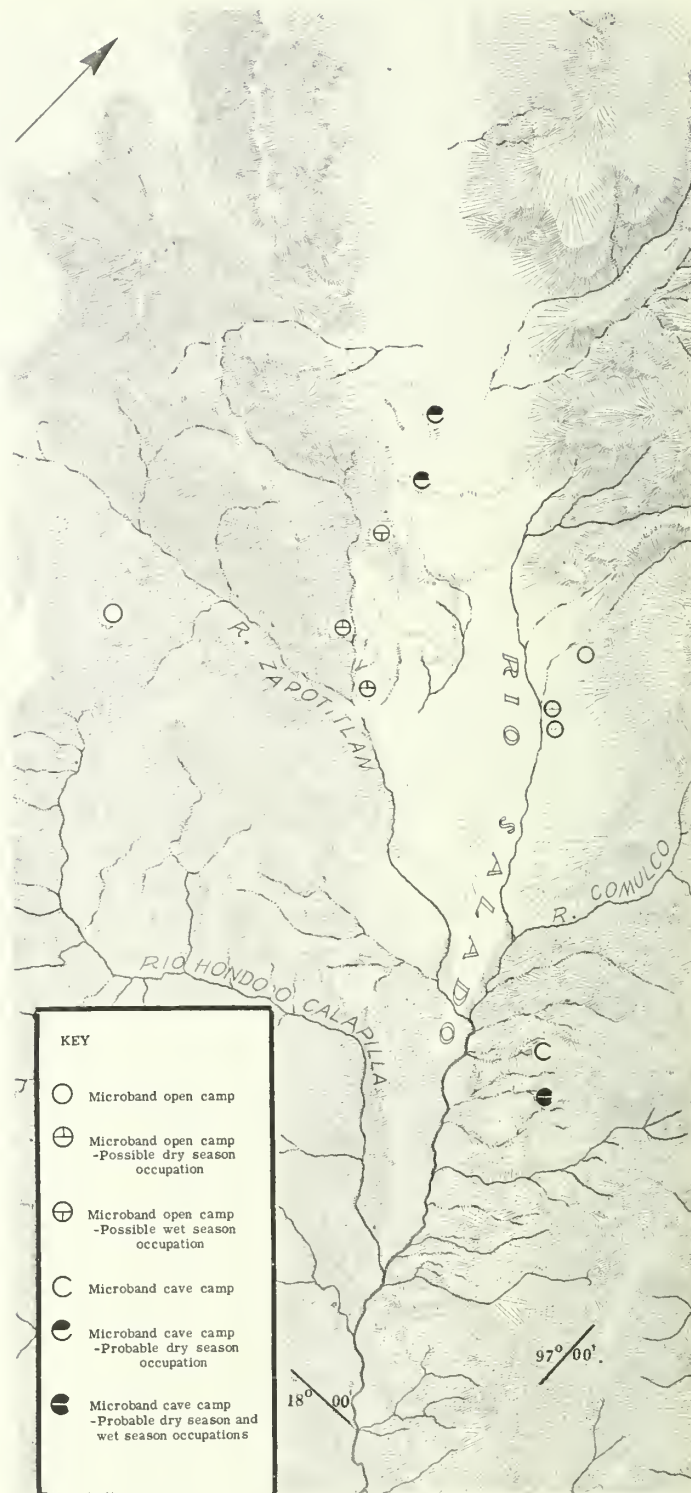


Fig. 143. Map of Ajuereado settlement pattern types in the Tehuacan Valley.

certainty that population in the Tehuacan Valley during the Ajuereado Phase was extremely limited; probably no more than two or three family-size microbands occupied the valley at the same time.

Economic seasonality—i.e., annual cyclic variation in the exploitation of natural resources in various micro-environs—is also difficult to determine for these microband occupations, for the reason that the early and major part of the Ajuereado Phase was during the Pleistocene (10,000 B.C. to 7600 B.C.), while the end of the phase occurred in the Recent (7600-6800 B.C.). Our environmental studies (Flannery, 1967; Byers, 1967; Brunet, 1967) indicate the seasons in early Ajuereado probably were not as well marked as those at present. Probably there was only a wet and a dry period, with more frosts during the winter dry season, than there are at present. Although there may have been little difference in the amount of rainfall, a higher water-table probably meant more water in the streams and the now dry arroyos. Concomitant with this would have been extended Valley Center waterways, along with their gallery forests, which perhaps at that time housed not only most of the modern fauna all year round, but also extinct mammoth, mastodon, and extinct turtle; and perhaps in the dry season, horse and antelope as well. Our archaeological evidence also seems to indicate that the grasslands were more extensive, encompassing areas of the Alluvial Slopes, now covered by thorn forests, and much of the Travertine Slope areas that are now defined by their xerophytic vegetation (see Fig. 142). In this extended grassland area, while modern fauna may have existed, herds of horse, antelope, and jackrabbits would have been predominant.

All of the early components from Coxcatlan Cave, with evidence of seasonality, Zones XXVIII, XXVII, XXVI, and XXV, seem to have been wet-season microband camps in what was then a grasslands Valley Center Steppe micro-environment. Bones of hibernating reptiles were uncovered in all of these zones. The possible Ajuereado component from Zone C of Tecorral Cave in San Marcos Canyon, now in the desert-like Travertine Slopes micro-environment but probably then in a well-watered canyon (with gallery forests on the stream flanks and grasslands on the high terraces), may also have had a wet-season microband camp, for it also had extinct turtle remains. A probable dry-season camp of this early time period was in the lower level of Tc 39 in the Oasis micro-environment. Here, along with the Ajuereado artifacts, was a hardened deer antler fragment, indicating a winter dry-season occupation. Thus, poor as our proof may be considered to

be, there is, nevertheless, some evidence of economic seasonality in early Ajuereado times, with a dry-season camp in the Oasis and wet-season camps in what was then the Valley Center Steppe or flanks of the waterways. However, since the subsistence option that the early Ajuereado people preferred in exploiting their environment was hunting, particularly herd hunting, their seasonal movements may have reflected those of the fauna rather than "any hierarchy of priorities resulting in temporal ordering of selected options," that is, true scheduling. In late Ajuereado, after the environment (and micro-environments) had become much like that of today, the pattern reveals a similar picture. Probable dry or winter season microband camps occur in Activity Areas A and B of Zone XXIII and in Activity Area B of Zone XXIV, in Coxcatlan Cave, then in the alluvial slopes thorn forest. All had no milling-stones and had some hard winter antler. However, the *Opuntia* fruit, *Setaria*, grass, and amaranth seeds of Area B of Zone XXIV may indicate the latter lasted into the spring. Layer 6 of Tc 35 in the El Riego Oasis also lacked milling-stones and was probably a dry-season microband camp. Ts 380 and Ts 383, on terraces along streams and without grinding-stones, possibly could be other dry-season camps. Our only good evidence of wet-season camps is from the following activity areas of Coxcatlan Cave in the alluvial slopes: Area A of XXIV, with chupandilla and avocado fruits, and Area C with lizards and a deer fetus, and Activity Area C of Zone XXIII with spring seeds and metates and Zone XXVI with grass seeds and mesquite pods. Ts 372 in the Travertine Slopes, with a small fragment of a grinding-stone and scraper-planes, could possibly be of this same season. Like the early Ajuereado components, late Ajuereado components show evidence of seasonality, but no scheduling. This we consider to be nomadic behavior. Further, none of the Ajuereado sites cluster into neat units, so there is no clear evidence of microband territoriality nor of the concept of microband estates, that is, areas with relatively fixed boundaries or locations with which groups had permanent affiliations. In other words, the "territory"—that area from which a group regularly procures resources—of all the microbands was the whole Tehuacan Valley, and perhaps even beyond it. These seasonally nomadic microbands, without specific territories and without a well-defined scheduled subsistence pattern, have been classified as *Nomadic Microband Communities*. Here we are defining "community" as the largest grouping of persons in any particular culture whose normal activities bind them together into a self-conscious, corporate unit, which is relatively

economically self-sufficient and politically independent.

The Survey Sites

Ts 500. This small site found in 1971 is located on the east high terrace about 30 meters above the Barranca de San Antonio and about 3 kilometers above its junction with the Rio Salado. We found three Lerma points, a keeled end-scraper, one flake chopper, and two flake side-scrappers retouched on one edge.

Tc 391. This small cave facing south was located in a cliff of a small knob-shaped hill 1 km. east of Tc 50. In the lowest levels of a 1-meter-deep test excavation, down among the loose rock fill, we found some Lerma points and other Ajuereado artifacts, just above the rock floor in no discernible stratum.

Ts 383. This small open site is situated on the south side of the Arroyo de Atexcala on a high terrace about 20 meters above the present bed of the arroyo. It is located about 6 kilometers northwest, upstream from the confluence of the Arroyo de Atexcala and the canyon of the Rio Zapotitlan.

Ts 380. This small microband camp is located on the north side of the Arroyo de Atexcala, about 500 meters northwest of its mouth, where the arroyo enters the canyon of the Rio Zapotitlan. It is situated on the second terrace, about 18 meters above the present bed of the arroyo. There are chips and other lithic materials extending over an area some 50 meters wide and 200 meters long along the edge of the terrace. This natural terrace also has a series of low agricultural terraces or linear borders made of stone slabs with associated Venta Salada pottery, and some of the lithic debris covering this large area may very well represent occupations by later people. It could have been occupied by a macroband camp for a limited time, or it could have been two or three microband camps which were located side by side during different seasons. This is our biggest early site and our only evidence for an Ajuereado Phase occupation bigger than that of a microband. However, since even this evidence is not very convincing, we guess it probably was a microband camp or camps.

Ts 372. This site is on the top of a hill on the travertined northwestern flanks of the Tehuacan Valley, and seemed to have eroded out of a dark stratum less than an inch thick which appears just below the humus.

Ts 343 (Early Venta Salada Phase) is described below.

		Tc 50, XXVIII	Tc 50, XXVII
MICRO-ENVIRONMENTS			
	El Riego Oasis		
	Travertine Slopes		
	canyon bottoms		
	hilltops		
	Valley Center Steppe		
	Humid River Bottoms		
	Pleistocene Grasslands	X	X
	Alluvial Slopes		
	valley flanks		
SEASONALITY			
Fall	{ AVOCADO FRUIT		
	{ CHUPANDILLA FRUIT		
	{ FETAL DEER		
Summer	{ SNAKES	X	
	{ LIZARDS	X	X
	{ TURTLE	X	X
	{ <i>milling stones</i>		
Spring	{ Amaranth seeds		
	{ mesquite seeds & pods		
	{ grass seeds		
	{ <i>Setaria</i> seeds		
	{ NOPAL FRUIT		
Winter	{ hard deer antler		
Fall-Winter	{ no <i>milling stones</i>	X	X
	{ no <i>wet-season animals</i>		
COMPONENT DIMENSIONS			
	length in meters	?	?
	width in meters	?	?
	extent in sq. meters	?	?
SETTLEMENT FEATURES			
	fired area		
	roasting pit		
	storage pit		
SETTLEMENT TYPE			
	Microband water-source cave camp		
	probable dry-season		
	Microband water-source open camp		
	possible dry-season		
	Microband open camp		
	possible wet-season		
	Microband dry open camp		
	Microband dry cave camp		
	probable winter		
	Microband cave camp		
	possible winter or spring		
	possible summer or fall		
	Microband cave camp		
	probable wet-season	X	X
	probable spring		

Ajuereado Settlement Pattern Data

[illegible]



Fig. 144. The reconstructed El Riego settlement pattern in the Tehuacan Valley.

The El Riego Settlement Pattern

Forty-one El Riego components included thirty from excavation. Of these, twenty-five are considered definite floors. Twenty-one of these floors were short occupations covering small areas from 4 to 60 square meters and containing only one or two hearths and are considered to be microband camps. Although Zone C of Tc 255, the lower levels of Tc 256, Level 7 of Tc 39, and Layer 5 of Tc 35 (all strata or arbitrary levels containing El Riego artifacts) were not associated with definite floors, they were all small caves that could have housed microbands. Three open sites, Ts 384, Ts 379, and Ts 374, had El Riego artifacts and chips spread over slightly larger areas, 500, 400, and 20 square meters respectively, but the bulk of their artifacts came from only small parts of these sites, and these three we have tentatively classified as microband sites.

The four other excavated sites had well-defined floors. Zone D of Ts 51, lower Zone XIV of Coxcatlan Cave, including Activity Areas E through J, with two fireplaces and two storage areas, Activity Areas A, B, C, E, F, G, H, and perhaps I of Zone XV with a cache pit, a fireplace, and two storage areas, and Activity Areas A-G of Zone XVI from Coxcatlan Cave, all covered, respectively, over 1,000 square meters, more than 450 square meters, about 450 square meters, and more than 360 square meters, had more than three hearths, and were occupied for one or more seasons. These all seem to be macroband encampments, i.e., groups of three or more nuclear families and linked individuals. A huge site, Ts 381w, covering more than 10,000 square meters, was tested, and a huge rock-filled roasting pit,

which had been repeatedly utilized, was uncovered. This site, we believe, probably was an open macroband camp or camps. Four other sites found in survey, Ts 252, Ts 390, Ts 377, and Ts 387, had El Riego artifacts and chips spread over large areas, 15,000, 6,000, 10,000, and about 5,000 square meters respectively, and were tentatively classified as open macroband sites, although the possibility exists that they could have been a very large number of microband encampments covering a whole series of adjacent areas.

From the surfaces of Ts 204, Tr 318, Tr 323, and Ts 367 some El Riego type artifacts were collected, along with artifacts of many other phases, but we were unable to determine exactly what kind of El Riego settlement type had occurred. In spite of this, however, we do have evidence which seems to suggest that there were at least twenty-nine microband and at least nine macroband occupations during the El Riego Phase, which lasted, roughly, from 6800 or 7000 B.C. to about 5000 B.C.

This represents a great increase, not only in the number of components from Ajuereado to El Riego times (from twenty-one to forty-one), but also in the total area covered by these sites. Area of occupation jumped from 1,862 square meters in Ajuereado times to about 49,959 square meters in El Riego. Or, to put it another way, the per-century occupation for Ajuereado was about 235 square meters, while that of El Riego was about 2,442 square meters. Certainly this would appear to mean a great increase in population during El Riego times, mainly in the late part of the El Riego Phase. Determining actual figures for the El Riego

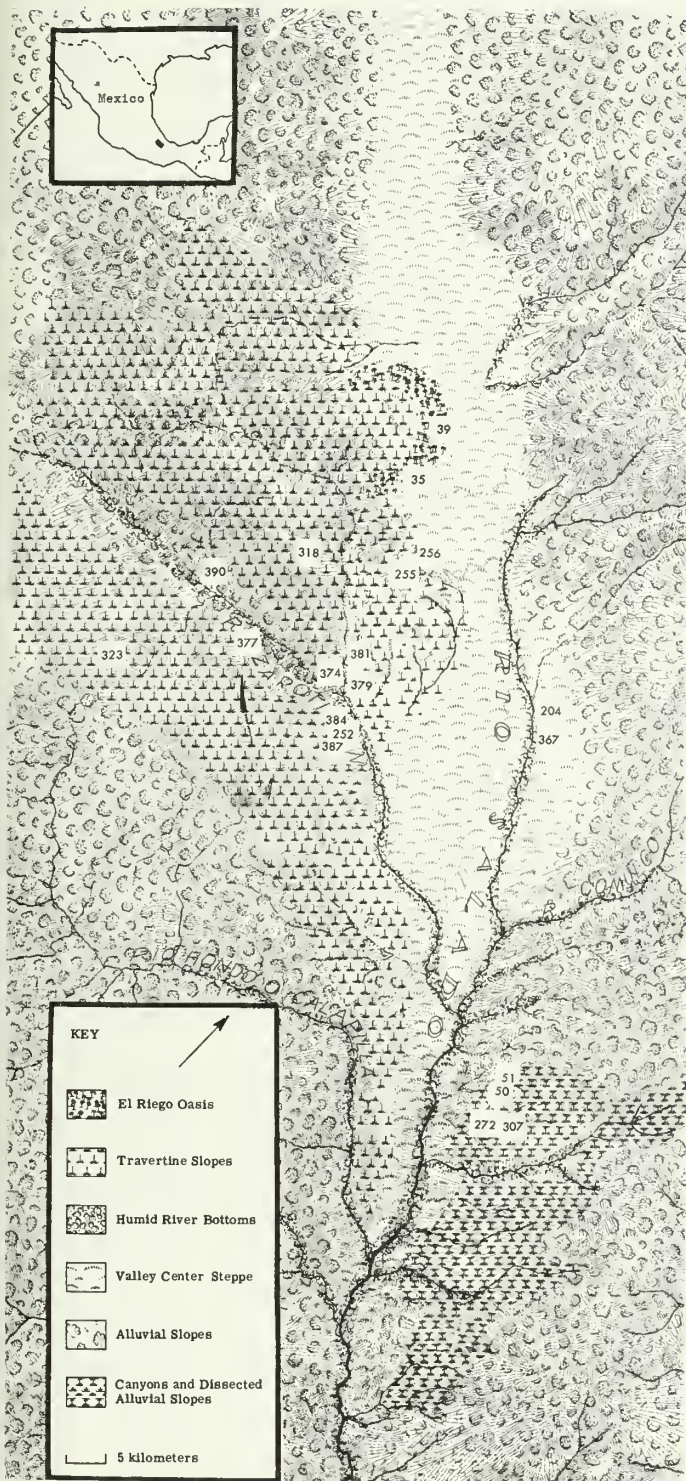


Fig. 145. An ecozone map of numbered El Riego sites in the Tehuacan Valley.

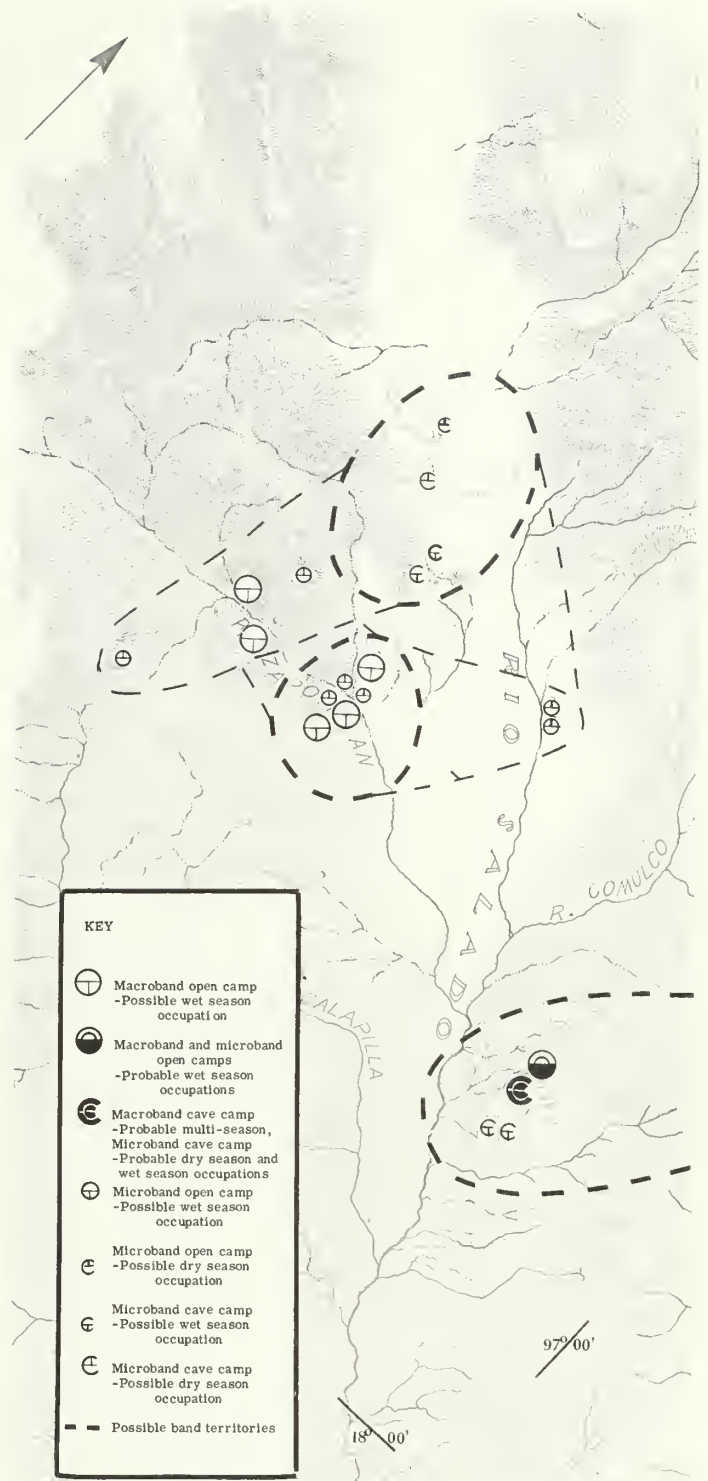


Fig. 146. Map of El Riego settlement pattern types in the Tehuacan Valley.

population is, of course, impossible, but, using the Bushman land/man ratio of one person to 20 square meters of encampment, one would arrive at a figure of 122 El Riego people per century. Perhaps a guess of from 100 to 150 people for the Tehuacan Valley during the El Riego Phase would not be too far off the mark. Further, not only is the overall population of El Riego far greater than that of Ajuereado, but also many of the more recent components were occupied for a greater number of consecutive seasons, as evidenced by our more abundant seasonal indicators (Table 24). Also, the El Riego Phase occurred in a period when the climate and the environment were not radically different from now, so these present-day seasonal indicators are directly applicable.

Three occupations in Coxcatlan Cave in the thorn forest of the eastern Alluvial Slopes are macroband occupations. Activity Areas A through G of Zone XVI seem to have ended in the winter season, as evidenced by the hard deer antler, pochote remains, and remains of nopal fruits, but lasted into the summer, as indicated by lizard bones, pepper seeds, and fetal deer remains, and carried on into the fall, for there were pits of chupandilla, avocado, and ciruela fruits. Activity Areas A-C and E-I of Zone XV of the same cave seem to represent a three-season macroband occupation starting in the spring, as there are a whole series of seeds that reach fruition in that season, but it lasted to the fall while the overlying macroband occupation, Activity Areas E through J of Zone XIV, has many seasonal indicators, suggesting that occupation may have started in the late winter or early spring, carried on through summer, and lasted into the fall. The other macroband occupation in the thorn forest is in an open site, Ts 51, on the terrace below Coxcatlan Cave. The lizard bones found in Zone D show that it was occupied during part of the wet season (spring and/or summer).

The other macroband camps are all near the Zapotiltan Arroyo in the xerophytic western Travertine Slope micro-environment. The one with the best evidence of seasonality was at the open site, Ts 381w. Burned pochote remains and a turtle shell, as well as grinding-stones, suggest a spring and/or summer occupation. The other four open camps, Ts 252, Ts 390, Ts 387, and Ts 377, are more difficult to pin down to a season or seasons of occupation, but all had grinding-stones on them, suggesting occupations, at least in part, of the wet season (spring and/or summer).

Evidence of scheduling from the macroband camps is convincing. All were occupied during at least part

of the wet season and in only two subdivisions of two micro-environments, the eastern Alluvial Slopes and the arroyos of the western Travertine Slopes. In components occupied by microband camps, however, the evidence is somewhat less. The poorly defined microband components in the caves Tc 35 and Tc 39 in the El Riego Oasis and the surface collections of El Riego artifacts from the Valley Center sites, Ts 204 and Ts 367, lack the milling-stones that are so indicative of wet-season occupation, as do Tr 318 and Tr 323 in the western Travertine Slopes, thereby suggesting that these six components are winter dry-season encampments. Somewhat the same sort of slim evidence may indicate that three of the microband components of the western Travertine Slopes micro-environment, Ts 374, Ts 379, and Ts 384, possibly were also dry-season camps. Of the fifteen microband occupations in the thorn forest, only five, all late in the sequence, appear to be of the dry season. Activity Areas A and F of Zone XVIII of Tc 50, with pits of cosahuico and avocado fruits, and no grinding-stones nor wet-season animal bones, and Zone XVII of Tc 50 with pits of chupandilla and cosahuico and no wet-season animal bones, both seem to have been occupied during the fall. The lower levels of Zone XIV in Activity Areas A through D, with evidence of nopal and tetecho fruit, pochote pods and seeds, definitely seem to be winter season, and areas H and I of Zone XVI with cosahuico fruit pits and hard antler may be summer-fall-winter. Area D of Zone XV, with no milling-stones nor any wet-season animal bones, may represent a brief winter visit to Coxcatlan Cave. Zone R of Tc 272, because of its chupandilla and reptiles, may be a summer-fall occupation. The majority of the microband sites of the eastern Alluvial Slopes, however, were wet-season sites. Zones XXII, XXI, XX, XIX, and Activity Areas B, C, D, E, and G of Zone XVIII of Tc 50, on the basis of the seeds and reptiles, all seem to have been of the spring season, and Zone E of Ts 51 with grinding-stones appears to be of part of the wet season. Two cave occupations in San Marcos Canyon, Tc 255 and Tc 256, on the basis of turtle bones, scraper-planes, and grinding-stones, may be microband occupations during part of the wet season. However, nine of the microband occupations, Zones S, T, and U of Purron Cave (Tc 272) and Zones D¹, D², E, F, G, and H of Abcjas Cave (Tc 307) in the Dissected Canyons micro-environment, seem to be of the wet season, while Zone R of Tc 272 was of the fall.

On this basis, we interpret the seasonality of the El Riego Phase as follows: in the dry seasons, micro-

bands lived mainly by hunting in the Oasis and along the riverbanks of the Valley Center steppes, with only occasional brief forays into the eastern Alluvial Slopes or, more rarely, into the canyons of the western Travertine Slopes. In the spring, microbands moved into the Dissected Canyons, the western Travertine Slopes, and the eastern Alluvial Slopes for longer stays, collecting seeds, and, in the lush years, some of the microbands in the Travertine Slopes and the eastern Alluvial Slopes may have coalesced into macrobands during this season. These same micro-environs (though not necessarily the same spots) continued to be exploited during the wetter summer months as the people continued to collect seeds and pick fruit. With the coming of fall and its diminution of food supplies, the microbands began moving back to their winter abodes. This behavior constitutes a regular pattern of economic seasonality, and, since the pattern seems so regular for so long a period, one can suspect that it was culturally determined, and that the temporal ordering of where groups moved in the various seasons was governed, consciously or unconsciously, by selection of certain subsistence techniques (subsistence options), in order to exploit the various seasonally available resources (resource options) in the various micro-environments. Thus, the seasonality (pattern?) was a scheduled one.

The distribution of El Riego components in the Tehuacan Valley hints at one other feature of the settlement pattern; that is, the existence of territoriality or the regular procurement by a group of the resources of a particular area or region. One cluster of components (four macroband and twenty-one microband occupations) in the south end of the valley, in the Dissected Canyons and the south end of the eastern Alluvial Slopes, is widely separated from the other El Riego sites and might represent a band territory. A second cluster, composed of six sites, three microband and three macroband, occurs on the Zapotitlan River near its junction with the Atexcala Arroyo in the central part of the valley, while a third cluster of at least four microband occupations occurs in the north-central part of the valley. Both of these latter clusters may be parts of band territories. Just to the west of these two clusters are two macroband sites, Ts 390 and Ts 377, and two microband sites, Tr 323 and Tr 318, while to the east of them are sites Ts 204 and Ts 367. It is difficult to determine which of the two clusters these six individual sites may be connected with; nevertheless, distribution seems to favor at least three or possibly four band territories during El Riego times.

This settlement pattern of seasonally scheduled mi-

crobands and macrobands, with territoriality a factor, has been classified as a *Seasonal Micro-Macroband Community Pattern*.

The Survey Sites

Ts 387. This campsite is on the west side of the arroyo that passes just west of the village of Xaco. It is situated on a low terrace and ploughed field about 300 meters south upstream from the arroyo's juncture with the Rio Zapotitlan.

Ts 377. Ts 377 is located on the south side of the Rio Zapotitlan across the Miahualtepec, about 2 kilometers southeast of Zapotitlan Salinas. There is a buried occupational level in the eroded high terraces found in this area. It is about 2 meters below the present ground surface.

Ts 390. This site is located south of the Rio Zapotitlan, about one kilometer southwest of the town of Zapotitlan Salinas. It is situated on the point where the first small arroyo southwest of the town joins the Rio Zapotitlan on the highest terrace.

Ts 379. Ts 379 is immediately northwest of the junction of the canyon of the Rio Zapotitlan and the Arroyo de Atexcala, on the high terrace remnants some 60 meters above the river bed.

Ts 384. This site is located to the south and above the arroyo of the Rio Zapotitlan, directly across from the mouth of the Arroyo de Atexcala. It is situated on the second high terrace, about 30 meters above the present arroyo bed.

Ts 252. This camp is due west of San Gabriel Chilac and about 200 meters east-southeast of the junction of the Rio Zapotitlan and the Arroyo de Atexcala, and east of the small town called Xaco. It is actually on the road from Chilac to San Juan Atzingo, situated on a terrace back from the southern rim of the canyon which is almost 25 meters above the Rio Zapotitlan.

Ts 374. Located on the west side of the junction of the canyon of the Rio Zapotitlan and the Arroyo de Atexcala is a small campsite situated on the highest terrace a full 25 meters above the arroyo.

Indeterminate Occupations

Tr 318 (Late Palo Blanco Phase) is described below.

Tr 323 (Late Venta Salada Phase) is described below.

T A B L E 24
El Riego Settlement Pattern Data

		Tc 50, XXII	Tc 50, XXI	Ts 387	Tc 255, C	Tc 50, XX, A-C	Tc 39, level 7	Tc 50, XIX, A-E	Tc 307, H	Ts 204	Tc 50, XVIII, B,C,D,E,G,	Tc 50, XVIII, A,F	Tc 272, U	Tc 272, T	Tc 50, XVII, A-C	Tc 272, S
MICRO-ENVIRONMENTS																
	El Riego Oasis						X									
	Travertine Slopes															
	arroyo flanks			X	X											
	Valley Center Steppe															
	humid river flanks									X						
	Alluvial Slopes															
	valley flanks	X	X			X		X			X	X			X	
	Canyons and Dissected Alluvial Slopes															
	canyon flanks								X				X	X		X
SEASONALITY																
Fall	CIRUELA FRUIT															
	AVOCADO FRUIT										X					
	CHUPANDILLA FRUIT															
Summer	FETAL DEER		X												X	
	Mixta squash seed															
	Pepper seed							X								
Spring	FISH					X					X					
	LIZARD				X	X		X			X					
	Turtle															
Spring	Milling stones	X	X	X		X		X	X		X		X	X	X	X
	Amaranth seed							X			X					
	Mesquite seed							X			X	X				
Spring	Grass seed	X	X			X		X			X					
	Setaria seed	X	X			X		X			X	X				
	Leucaena seed															
Winter	Cardon seed	X	X													
	NOPAL FRUIT	X														
	Pochote seed & pod															
Winter	TETECHU FRUIT															
	Hardened deer antler		X									X				
	No milling stones				X		X			X		X				
Fall	No wet season animals						X					X			X	
	FETAL PECCARY															
	COSAHUICO FRUIT										X				X	
COMPONENT DIMENSIONS																
	Axis	NE, SW	EW	NS		NS		EW			SE, NW	EW		NS	EW	NS
	Length in meters	4	5	100	4	9	?	13	2	—	15	3	4	6	12	7
	Width in meters	3	3	50	4	5	?	5	2	—	6	9	3	4	10	4
	Extent in sq. meters	ca.16	ca.22	ca.5000	16	ca.44	?	ca.40	4	—	ca.90	ca.42	12	25	120	28
SETTLEMENT FEATURES																
	Burial (multiple and/or extended)															
	Burial (bundle)															
	Cache pit										1					
	Fire pit							1			1			1		
	Storage pit					2		1			1					
	Roasting pit															1
	Charcoal area										1		1?			
SETTLEMENT PATTERN TYPES																
	Macroband multi-season camps															
	probable spring-summer-fall cave camp															
	probable summer-fall-winter cave camp															
	Macroband wet-season(s) camps															
	possible wet-season open camp			X												
	Microband multi-season camps															
	summer-fall cave camp															
	Microband wet-season camps															
	spring cave camp	X							X				X	X		
	wet-season cave camp		X		X	X		X			X					X
	wet-season open camp															
	Microband dry-season camps											X				
	dry-season open camp															
	fall cave camp														X	
	winter cave camp															
	Microband dry-season water-source camps															
	possible dry-season cave camp						X									
	possible dry-season open camp									X						

[illegible]



Fig. 147. The reconstructed Coxcatlan settlement pattern in the Tehuacan Valley.

The Coxcatlan Settlement Pattern

Coxcatlan artifacts occurred at twenty-three components and over half of these were from excavation. Of the twelve from excavation, nine are microband encampments. Six of these—Activity Areas A through D of Zone XII of Tc 50, Zones Q and Q¹ of Purron Cave (Tc 272), Zones E and F of San Marcos Cave (Tc 254), and Zone D of Abejas Cave (Tc 307)—are all well-defined small floors with limited numbers of features. Level 6 of Tc 39 and Layer 4 of El Riego Cave (Tc 35w) covered a limited area, but were thick strata, with hearth areas at different elevations, and probably represented more than one occupation. Two other possible microband components are represented by Coxcatlan projectile points and other Coxcatlan tools amongst artifacts of various other periods from the surface of two large ruins, Tr 358 and Tr 326.

Evidence for macroband sites is not as concise. Zone XI of Tc 50 yielded the best evidence in Activity Areas A to F with four hearth areas, as well as three storage pits and two cache pits. But on this floor, a study of the profiles revealed it extended both north and west beyond our area of excavation. This situation is similar to that of Zone P of Tc 272 where we excavated only 50 to 60 square meters, about half of the floor. Even in this small area three fire pits and a roasting pit hinted at an occupation of more than 3 microband groups. The other large site that seems to represent macroband camps was Ts 365 on a terrace in the Dissected Canyons. Excavation revealed that the Coxcatlan artifacts came from a single buried stratum, Zone C, which extended over an area of at least 450 square meters. Although there was definite floor like the previous two,

and no secure evidence that this was not a series of adjacent microband camps, the widely-spaced hearths suggest that it was occupied by a single macroband group for a short period. Six other extremely large open sites were discovered, and, because of their size and abundant artifacts, they have been tentatively classified as possible macroband encampments. The remaining three sites, yielding many Coxcatlan artifacts, were the multi-occupied sites, Ts 204, Ts 367, and Ts 368. These could not be classified, but the relatively large number of Coxcatlan artifacts does suggest the possibility that they were macroband sites. The above evidence indicates that there were, very probably, at least ten microband, with the possibility of ten to thirteen macroband, camps.

Although the twenty-five Coxcatlan components are less in number than the forty-one of the previous phase, El Riego, the Coxcatlan components, mainly because of the macroband sites, cover a much larger area, 97,302, as against 49,959 for El Riego, or 6,900 per centum as against 2,442. Coxcatlan populations seem to have been larger than those of El Riego, but this increase is proportionally much smaller than that which occurred between Ajuereado and El Riego. Again, population figures for the Tehuacan Valley during the Coxcatlan Phase cannot be determined exactly, but we would hazard the guess that between 150 and 400 people lived in the region at this time.

One of the explanations for the seeming contradiction between the larger Coxcatlan population and the smaller number of Coxcatlan components (basically microband sites) is that the Coxcatlan microband

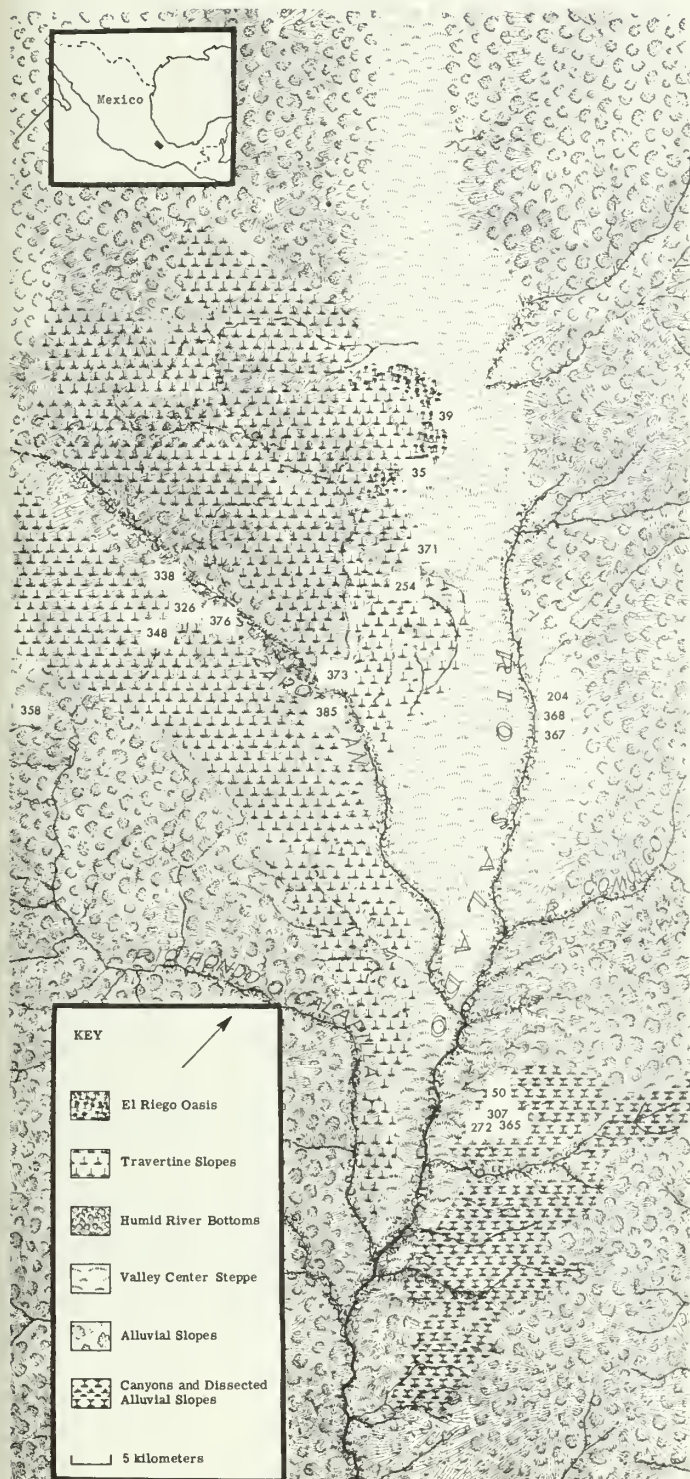


Fig. 148. An ecozone map of numbered Coxcatlan sites in the Tehuacan Valley.

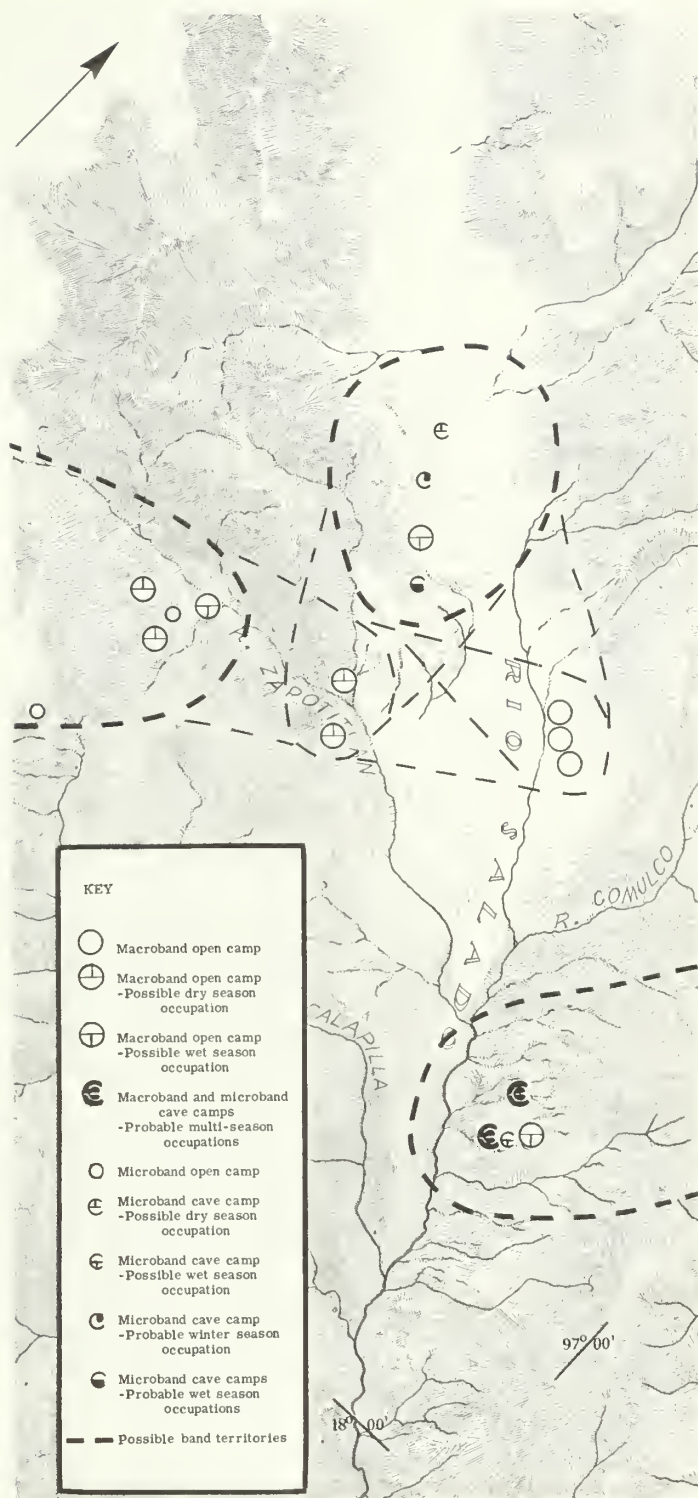


Fig. 149. Map of Coxcatlan settlement pattern types in the Tehuacan Valley.

camps were occupied for greater numbers of seasons than those of El Riego. Of the ten microband components of El Riego that had adequate evidence of seasonality, nine of them show occupation during only one season. This contrasts with the seven microband occupations of Coxcatlan that had secure seasonal indicators; one occupied for a single season, five for two consecutive seasons, and one for three consecutive seasons.

The floor on Zone XIII of Tc 50 in the eastern Alluvial Slopes contained tetecho fruits and sandhill crane bones representing the spring, corn, pepper, and squash indicative of the summer, and fruits of chupandilla, ciruela, and cosahuico as markers for the late summer and fall seasons, as well as other less important seasonal indicators. This seems to be almost a complete year-round microband occupation, and one might speculate that perhaps the storage of surplus spring seeds and domesticated plants of the summer, plus the use of fall fruits, allowed them to remain in this cave throughout the leaner fall and winter months.

One three-season microband occupation in this thorn forest zone can be seen in the upper parts of Activity Area E of Zone XI of Tc 50. Here, corn cobs, as well as sapotes, chupandilla, avocado, ciruela, and cosahuico fruits seem to show a summer-fall occupation. The two-season occupations were during the spring and summer in San Marcos Cave (Tc 254) in the western Travertine Slopes, where wet-season reptile bones in Zones E and F were associated with spring seeds, as well as with cobs of summer corn.

The tetecho fruits and lack of wet-season animals suggest that the microband occupations of Layer 4 of Tc 35w, in the El Riego Oasis, were only winter occupations. But, manos and many mortar fragments, as well as scraper-planes, hint that they might have lasted into the spring. The collection of artifacts from the surface of Tc 39 in this Oasis micro-environment, which is very similar to that of Tc 35, might have been occupied for a similar set of seasons. The other microband occupations, Zone Q of Purron Cave and Zone D of Abejas Cave, all in the Dissected Canyons region, appear to have occurred in the wet part of the year, but, because of the too few seasonal indicators, we could not determine exactly what season or seasons were involved. Zone Q¹ of Tc 272 and Tr 358 and Tr 326 of the Travertine Slopes may be of the dry season. However, secure seasonal evidence from Coxcatlan microband sites hint that most microband occupations were usually of more than one season.

Only two of the ten to thirteen macroband compo-

nents had really adequate seasonal data. These were in Activity Areas A through F of Zone XI, and A-E of Zone XIII, Tc 50, in the eastern Alluvial Slopes. Both were for at least three seasons. Other macroband components, on very limited information, can only be classified as wet-season or as dry-season occupations. Site Ts 365 in the Dissected Canyons, and Ts 371, Ts 373, and Ts 376 in the western Travertine Slopes, seem to be wet-season encampments, while Zone P of Tc 272, in the Dissected Canyons, may also be of this season. Ts 385, Ts 338, and Ts 348 in the Travertine Slopes seem to have been occupied in the dry season. The evidence from components with sufficient seasonal indicators makes one suspect that the multi-season occupations might have begun in the wet season, and ended in the dry season.

On a general level, the Coxcatlan components show evidence of scheduled economic seasonality, but the pattern is neither as rigid nor as well defined as that of El Riego. Whether this is because of a less adequate sample of sites, or whether it is due to a shift in the scheduling pattern caused by the use of domesticated or cultivated plants, cannot be determined at present. The pattern, however, seems to be one in which microbands, or, in lush years, microbands that had coalesced into macrobands, moved into the thorn forest, the river bottoms of the Travertine Slopes, and the Dissected Canyons to collect seed plants in the late winter or early spring. These spots were probably selected, not only for their available wild food produce, but also because the people could plant there during the spring season. Most groups continued to live in these same spots during the summer, perhaps now subsisting on wild foods as well as their harvested horticulture produce, and, in years when the harvest afforded storable surpluses, they may have stayed on in their camps into the fall or winter. In leaner years, or in years in which there was little surplus, they, like the El Riego peoples, probably moved into the El Riego Oasis or the Valley Center to eke out a living through the fall and/or winter. However, when surpluses were sufficient they may have merely moved either as microbands or macrobands into other parts of the Dissected Canyons or Travertine Slopes. This seems to have occurred mainly in later Coxcatlan times (Zone P of Tc 272 and Ts 338, Ts 348, and Ts 385). Besides being involved in subsistence activities, they also seem to have been quarrying flint and doing a considerable amount of flint-knapping. Thus, Coxcatlan peoples, like El Riego peoples, functioned as scheduled seasonal macro- and microbands and had a definite settlement pattern and

subsistence pattern strategy. By strategy we mean the conscious or unconscious adoption of a particular pattern of scheduled options.

The distribution of sites in the Tehuacan Valley shows three good clusters with a possibility of two more. One distinct cluster in the south-central part of the valley includes four sites (Tc 50, Tc 307, Tc 272, and Ts 365) with eight components (four microband and four macroband). Another cluster is in the north-central part of the valley, with four sites (Tc 39, Tc 35, Tc 254, and Ts 371), four microband and one possible macroband occupation. The third good cluster is in the west-central part of the valley where we found three possible macroband and two possible microband occupations. These clusters seem to represent band territories. The other five sites fall into two groups: Ts 385 and Ts 373, both macroband components, at the junction of Atexcala Arroyo and the Rio Zapotitlan; and the Coxcatlan surface collections from Ts 204, Ts 367, and Ts 368 in the center of the valley along the Rio Salado. Whether these band territories are separate, or whether they represent parts of the others which are more precisely defined, could not be determined. Regardless of which is the case, some definite communities are represented in Coxcatlan times by groups of seasonally scheduled micro- and macrobands in seemingly fairly well defined territories. Thus we consider the community type of Coxcatlan, like that of El Riego, to be a *Seasonal Macro-Microband*.

The Survey Sites

Ts 371. Chipping debris and Coxcatlan artifacts were sparsely scattered over the top of a barren limestone hill, located between the two main upper branches of Tecorral Canyon, in the north-central portion of the Tehuacan Valley.

Ts 385. This site is just west of Xaco, on top of a high (40-meter) terrace on the west side of an arroyo entering the Rio Zapotitlan from the south. This site comprised two interconnected areas of chipping debris and Coxcatlan artifacts.

Ts 338. A terrace on the lower eastern flanks of Cerro Castillo, overlooking the Rio Zapotitlan to the north, was covered by a great quantity of chipping debris, many flint nodules, and some Coxcatlan artifacts. The cultural material suggests that one of the main activities of this site was flint-knapping and quarrying.

Ts 373. Another campsite was found in the east-central portion of the valley on the high terrace on the north side of the Rio Zapotitlan, about 200 meters west of its confluence with the Arroyo de Atexcala. It was tested by a single slit trench 2 meters long and 1 meter wide which revealed two hearth areas. Most of the cultural deposits were found in the upper 20 centimeters of soil.

Ts 348. This site is located west of the Tehuacan Valley in the east-central portion of the Zapotitlan Valley. It is situated on the flanks of a hill, locally known as the "Loma del Toro," between Kilometers 28 and 29 on the west side of the highway from Tehuacan to Huajuapán de León. The whole side of the hill is littered with flint nodules and quite a lot of Coxcatlan artifactual material. It seems likely that this was, at least in part, a quarry and a chipping station.

Ts 376. This concentration of Coxcatlan artifacts was located in the eastern part of the Zapotitlan Valley, about 800 meters southwest of Zapotitlan Salinas. It is situated on the high ridge-like terrace forming the point between the junction of the Rio Zapotitlan and the Virgen Arroyo that enters the latter from the south.

Tr 358. Among the Venta Salada pyramids and thirty to forty house platforms on top of the hill named Cotozínchi, just south of Acatepec at the southernmost edge of the Zapotitlan Valley, was a Coxcatlan point and about a dozen other Coxcatlan artifact types. This indicates that some sort of Coxcatlan occupation had occurred at this mixed site.

Tr 326 (Late Venta Salada Phase) is described below.

		Tr 326	Tc 254, F	Tc 50, XIII, A-E	Ts 371	Tc 307, D	Tc 272, Q	Tc 50, XII, A-D	Tc 272, Q ¹	Ts 385	Ts 338	Tc 35w, layer 4	Tc 254, E	
MICRO-ENVIRONMENTS														
El Riego Oasis												X		
Travertine Slopes														
arroyo flanks			X							X			X	
slopes		X			X						X			
hilltops														
Valley Center Steppe														
humid river flanks														
Alluvial Slopes														
valley flanks				X				X						
Canyons and Dissected Alluvial Slopes														
canyon flanks						X	X		X					
SEASONALITY														
Fall	{	CIRUELA FRUIT		X										
		AVOCADO FRUIT						X						
		CHUPANDILLA FRUIT		X				X						
Summer	{	Bean seed						X						
		SAPOTE FRUIT						X						
		Squash fruit and seed			X			X						
		Corn seed		X	X			X					X	
		Pepper seed			X			X						
Spring	{	FISH												
		LIZARD					X		X				X	
		Turtle		X									X	
		milling stones			X	X	X	X					X	
		Amaranth seed							X					
		Mesquite seed		X	X				X					
		Grass seed			X				X				X	
		Setaria seed							X					
		Leucaena seed			X								X	
		Cardon seed			X									
Winter	{	NOPAL FRUIT		X				X						
		Pochote seed and pod		X									X	
		TETECHO FRUIT		X					X				X	
		CRANE		X										
		Deer antler											X	
Fall	{	no milling stones							X	X	X	X		
		no wet-season animals		X									X	
		COYOL FRUIT							X					
				X				X						
COMPONENT DIMENSIONS														
axis			NS	EW	NS	NS	NS	EW		NS	EW	NS	NS	
length in meters			2	20	100	10	11	12	9	100	100	8	6	
width in meters			1	6	100	4	4	8	5	100	30	5	4	
extent in sq. meters			2	120	10,000	40	44	96	45	10,000	6,000	35	20	
SETTLEMENT FEATURES														
burial									3					
cache pit														
fire pit				1		2			1			1		
storage pit														
roasting pit														
fired area		X		2					1	2		2	1	
SETTLEMENT PATTERN TYPES														
Macroband dry-season camps														
possible dry-season open camp										X	X			
Macroband multi-season camps														
summer-fall-winter cave camp				X(?)										
spring-winter cave camp														
Macroband wet-season(s) camps														
possible wet-season open camp					X									
wet-season cave camp														
Microband multi-season camps														
spring-summer cave camp			X										X	
spring-summer-fall cave camp								X						
Microband wet-season camps														
wet-season cave camps						X	X							
Microband dry-season camps									X					
dry-season open camp		X												
Microband dry-season water-source camps												X		

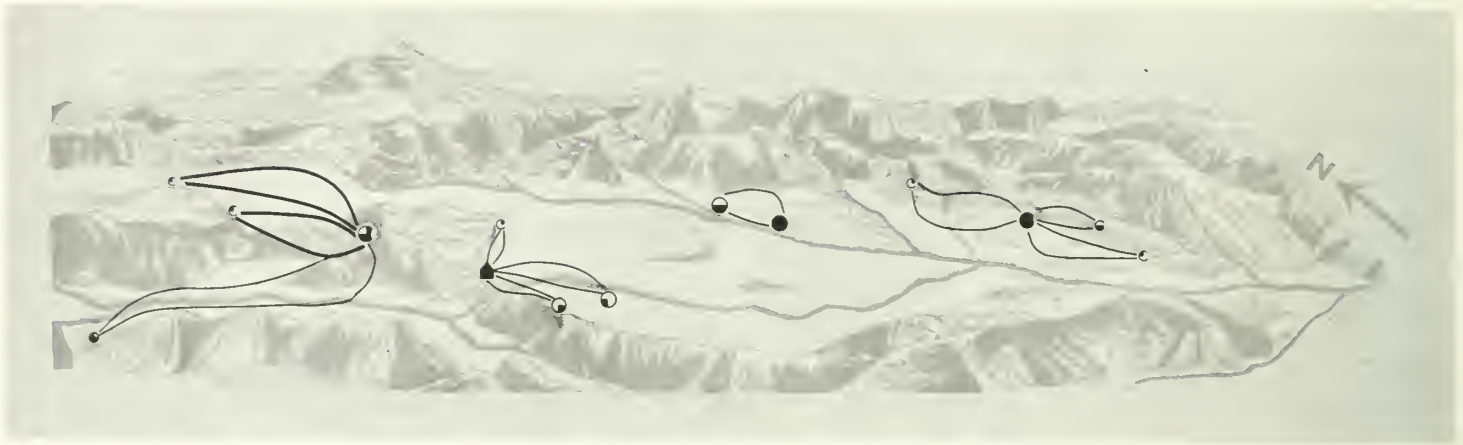


Fig. 150. The reconstructed Abejas settlement pattern in the Tehuacan Valley.

The Abejas Settlement Pattern

Twelve or thirteen of the thirty components had well defined floors. Eight or nine of them were microband encampments. Zone B of Tc 307 and Zones M, M¹, N, N¹, and O of Purron Cave (Tc 272) are small areas (28 to 50 square meters) capped by thin burned or charcoal layers well within the areas excavated. Zone X of Coxcatlan Cave also had a well defined charcoal or burned floor in the eastern two-thirds of our excavation, and it obviously extended still farther east into portions of the cave not excavated. However, since Zone X had but a single fire pit and only covered about 72 square meters, we have tentatively classified it as a microband camp. The situation in San Marcos Cave (Tc 254), Zone D, was more complex and open to a number of interpretations. We only excavated about 50 square meters of this zone, uncovering a well defined floor, but the original occupation obviously extended east, west, and north of our excavation where a well defined floor could not be discerned. Within this 50-square-meter excavation was a single fired area in 10 square meters in the western portion of the excavation (Zone D west) with pochote pods and *Leucaena* and grass seeds (late winter-spring plants). The remaining 40 square meters contained two fired areas and two pits with fire-crushed rocks associated with milling-stones, grass, and *Leucaena* seeds, turtle and lizard bones, as well as corn cobs, and in one feces some black sapotes skin. We have interpreted this as an indication that the western portion of Zone D was occupied in late winter-early spring by a microband that, in late spring or summer, as more people came into the cave, took on the proportions of a macroband that may have stayed on in the cave until early fall.

This situation seems analogous to that of Zone VIII of Tc 50. Here Activity Area A with no features or milling-stones seems to be a brief winter microband occupation. The rest of the floor in Activity Areas B, C, and D had fall, winter, and spring plants, animals associated with fired areas, a fire pit, and a storage pit, and there were even summer pepper seeds in Fire Pit 42. Thus, this zone seems to have become occupied by a macroband in the late fall, who stayed through the winter and lasted into the spring, or even summer. In total, Zone VIII, Areas B-D, covering about 80 square meters, is a little smaller than Zone IX, but it obviously extended north and east of our excavation and did have two or more hearth areas, so we classified it as a macroband camp, as was Zone IX, with 3 fire pits, a charcoal area, a cache pit, and 5 storage pits. Perhaps the best evidence of an Abejas macroband camp was Zone L of Purron Cave (Tc 272) in the Dissected Canyons micro-environment. This floor covered at least 65 square meters and contained two fire areas and two roasting pits.

Ts 381e, with its pit house, was secure evidence of a hamlet, that is, settlements covering from 500 to 100,000 square meters, with evidence of permanent habitations occupied for all seasons of the year, perhaps for a number of consecutive years, but without evidence of any specialized administrative, economic, or ceremonial centers within the hamlet (as would be evidenced by special structures, mounds, or plaza areas).

The above-mentioned components give us good evidence of settlement types during Abejas times. On less reliable evidence, Zones C and B¹ (strata with no de-

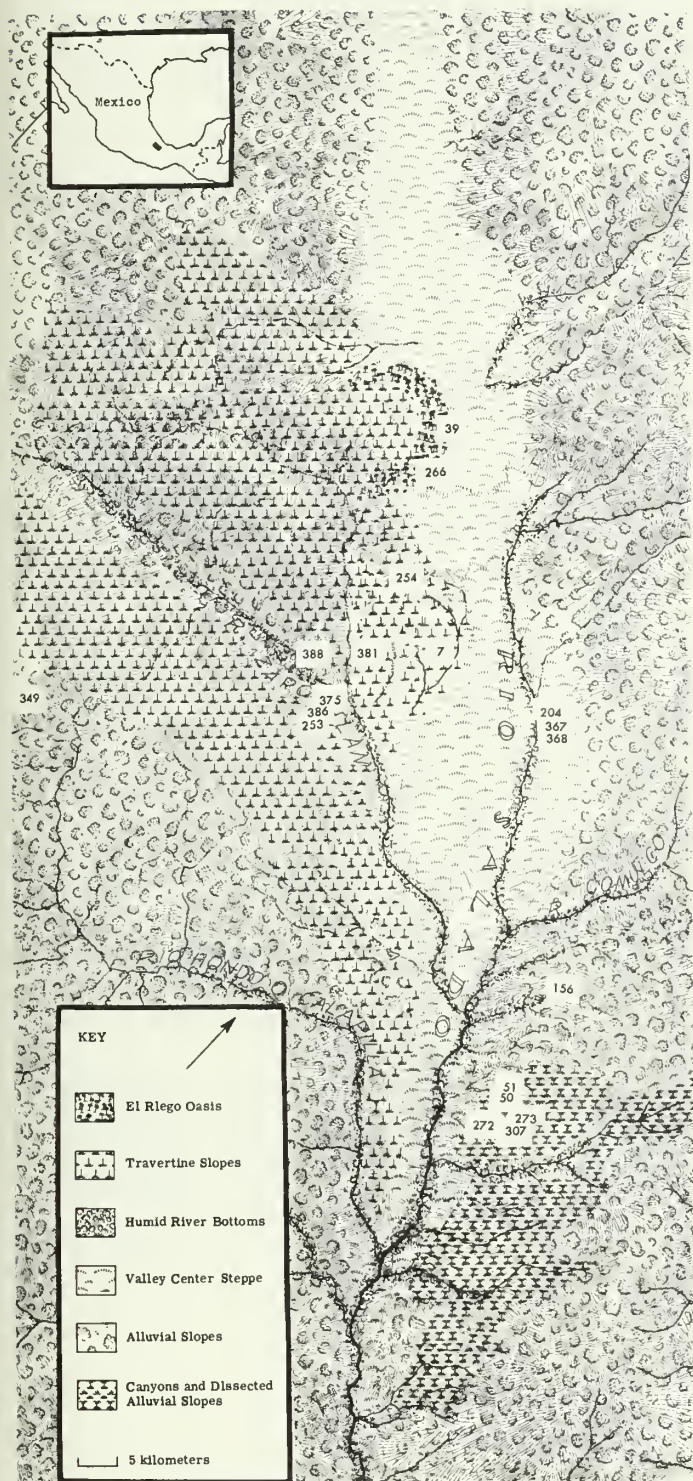


Fig. 151. An ecozone map of numbered Abejas sites in the Tehuacan Valley.

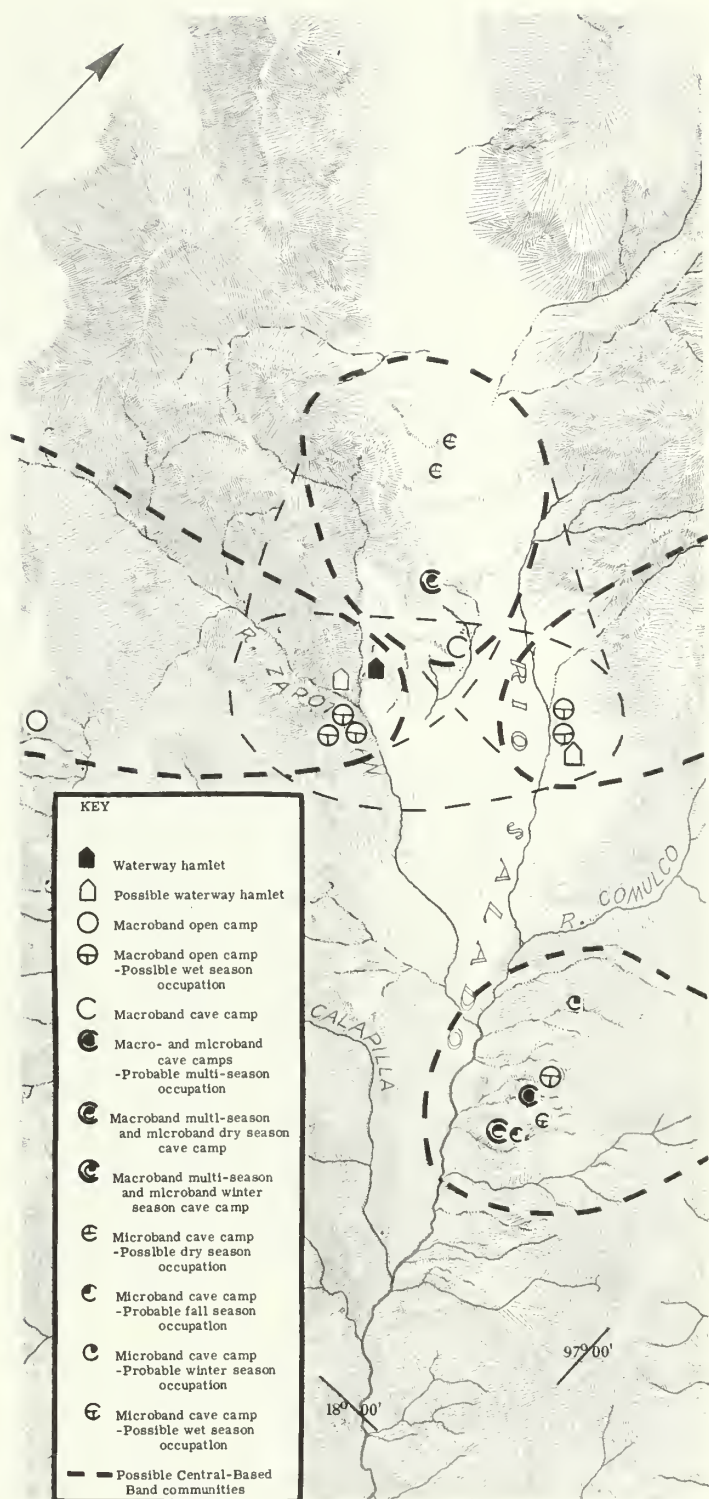


Fig. 152. Map of Abejas settlement pattern types in the Tehuacan Valley.

fined floors) of Tc 307 in the Dissected Canyons, which were relatively thin zones covering small areas, and the arbitrary levels with artifacts in the small cave tested, Tc 273, in the Dissected Canyons, and Tc 39 and Tc 266 in the El Riego Oasis region, as well as the small cave Tc 156 in the thorn forest with Abejas artifacts on its surface, may also be considered possible microband encampments. Zone C of Ts 51, a relatively thick stratum with no floor that covered a large area of the terrace in front of Coxcatlan Cave in the thorn forest, the extensive area covered by Abejas in and around Tc 7, a cave in the Travertine Slopes, the large sites Ts 386, Ts 375, and Ts 253, along the Rio Zapotitlan, and the large hilltop site, Ts 349 in the Travertine Slopes, and the large area with Abejas artifacts at Ts 204 and Ts 367 along the Rio Salado in the Valley Center, have been tentatively classified as macroband encampments. Even more difficult to classify were the large sites, Ts 388 along the banks of the Rio Zapotitlan and the part of Ts 368, right at the banks of the Rio Salado. However, since both had many large slabs of rock not normally found in river terraces, and since some of the slabs at Ts 388 were sitting upright in the ground, we have assumed that the slabs were associated with the slab-lined pit house (like that of Ts 381e) and, therefore, these two sites might have been waterway hamlets. Thus, in total, Abejas seems to have had fifteen microband camps, twelve macroband camps, and three possible hamlets.

Population in the valley during Abejas times seems to be greater than that during Coxcatlan times. The number of sites has increased from 24 to 30, and those of Abejas cover about 174,567 square meters, as against 97,302, or, to put it another way, ca. 16,000 square meters per century (11) as against 6,900 per century (14) for Coxcatlan. Proportionately, the rise from Coxcatlan to Abejas would not appear to be very different from that from El Riego to Coxcatlan. In terms of actual people in the valley, we would guess that Abejas population fell somewhere between 300 and 600.

Again, however, the Abejas sites show a rather different picture from that of the previous phase; the larger sites were occupied for greater numbers of seasons of the year, and the hamlets may have been occupied all year round for a number of consecutive years. One macroband component, Areas B-D of Zone VIII of Tc 50, with winter hard antler, pochote of late winter-spring, spring seeds such as *Leucaena*, grass, mesquite, and amaranth, summer peppers, corn, and squash, and fall beans, sapotes, chupandilla, avocado, and ciruela, seems to have been occupied for most of

the year. Zone IX of Tc 50 and Zone D of Tc 254 have good evidence that these macrobands were, also, in these caves from spring until into the fall, while Zone L of Tc 272 was almost as long. What little evidence of seasonality there is also suggests that almost all the other macroband sites, Zone C of Ts 51, Ts 386, Ts 375, Ts 253, Ts 204, and Ts 367 were occupied at least during the wet season or perhaps longer. Further, Zone X, classified as a large microband, was an all-year-round occupation. Thus, while there is a poor correlation between the seasonality of macroband sites and particular micro-environments, there is a good correlation between macroband or hamlet sites and long seasonal occupation (wet-season to all-year-round). However, what makes the Abejas pattern so strikingly different from that of the previous phase is that the microband sites are now almost exclusively winter- and/or spring-season occupations in all environments. This contrasts with both the El Riego and Coxcatlan patterns where some microband sites occurred in many areas in the wet season, and dry-season microband sites were mainly in the Oasis or Valley Center Steppe. Thus, occupations in the Abejas Phase still show seasonality, with a scheduling pattern which seems to be one in which, as microbands or macrobands, they settle in localities where they can collect wild seeds and plant crops in late winter and/or spring; while in the summer, as macrobands, they harvested these crops and had little need for wild foods. Usually there was sufficient harvested surplus so that, with the addition in the fall of ripened domesticated as well as wild fruits, they could stay on in the same spots. Occasionally, there were sufficient summer surpluses to get the whole group through even the winter as macrobands or as residents of hamlets. However, during many years harvests did not yield sufficient surpluses, so, during either the fall or winter, or both, microbands left the macroband central base camps or hamlets, or, in other cases, the macroband camp broke up completely into microbands who foraged where best they could. This is a very different scheduling than occurred previously and obviously is part of the final step leading to sedentary living.

As with the previous phases, there are very definite clusterings of components. Thirteen microband components and three multi-season macroband encampments cluster in the south-central part of the valley, and, in the north-central part, in the region of the El Riego Oasis, there are three microband camps associated with two macroband occupations, one of which was occupied for three seasons. The other two clusters have a slightly different makeup. One, along the Rio Zapo-

titlan in the west-central part of the valley, has three possible macroband sites (occupied at least during the wet season) and two hamlets, while the other cluster in the center of the valley is composed of two possible macroband sites and a hamlet. Two other sites occur and do not readily connect with any of the four clusters. The cave, Tc 7, with a macroband occupation, could belong to either of the latter two clusters, or the cluster associated with the El Riego Oasis, while the Abejas collection from Ts 349 could belong to the Zapotitlan River cluster or to some cluster outside our area of survey. Thus, these four well-defined clusters we believe represent band economic territories during Abejas times. Within each one of the territories either hamlets or multi-season macroband camps were surrounded by briefly-occupied microband or macroband encampments. We believe that these hamlets or long-occupied macroband camps served as central bases for the whole band and that microbands or occasionally macrobands split off for specific tasks or for seasonal food-gathering, later returning to the central base camp. This community pattern has been termed *Central-based Bands*.

The Survey Sites

Ts 388. The site is situated on a high terrace on the north side of the Rio Zapotitlan, about 2 km. west-southwest of its confluence with the Arroyo Atexcala. The terrace is about 60 meters above the river and behind two large, rocky prominences a short distance north of the river. Several slabs of stone projecting up through the surface of the site in a generally symmetrical arrangement strongly suggests the presence of stone-lined or slab-outlined pit houses.

Ts 386. The site located about 500 meters south of the town of Xaco is situated on a high (60-meter) terrace on the east side of the arroyo that passes west of Xaco on its way to Rio Zapotitlan.

Ts 375. The site is situated on a low (20-meter) terrace on the eastward extending point made by the junction of the Rio Zapotitlan and the unnamed arroyo passing just west of the village of Xaco.

Ts 253. Just east (about 100 meters) of the village of Xaco Abejas artifacts were found scattered over the eroded eastern terraces of a small arroyo as well as the flanks of the hill east of the terraces.

Tc 156. About two kilometers up the Barranca de Soyalapa from Coxcatlan was found a cave about 50 meters above the east side of that arroyo. A one-square-meter test about 30 cm. deep in the small shelter produced Abejas artifacts.

Tc 273. It is a small cave, situated on the west side of the small arroyo in front of Abejas Cave which drains into the Arroyo Lencho Diego. A few pieces of perishable material were recovered from among the heavy rock fall covering much of the cave floor.

Tr 349. This hilltop ruin with 8 mounds and a number of boulder house foundations was 1 km. west of Acatepec on a hilltop to the south on the south side of the highway. The majority of cultural remains are of the Classic Period, with large amounts of Thin Orange pottery, putting the site to the west of the western border of Palo Blanco. However, there were a few chipped-stone tools that indicated that it had been previously occupied by Abejas peoples.

Tc 39, a stratified cave, is described in Chapter 2.

Ts 204, a stratified site, is described in Chapter 5.

Ts 367, a stratified site, is described in Chapter 5.

Ts 368, a stratified site, is described in Chapter 5.

Tc 266, a stratified cave, is described in Chapter 2.

TABLE 26
Abejas Settlement Pattern Data

		Tc 272, O	Tc 50, X, A-D	Tc 254, D	Tc 254, D West	Ts 388	Ts 386	Tc 307, C	Tc 307, B ¹	Tc 307, B
MICRO-ENVIRONMENTS										
El Riego Oasis										
Travertine Slopes										
arroyo flanks				X	X	X	X			
slopes										
hilltops										
Valley Center Steppe										
humid river flanks										
Alluvial Slopes										
valley flanks			X							
Canyons and Dissected Alluvial Slopes										
canyon flanks		X						X	X	X
SEASONALITY										
Fall	CIRUELA FRUIT		X							
	AVOCADO FRUIT									
	CHUPANDILLA FRUIT		X							X
Summer	Bean seed									
	SAPOTE FRUIT		X	X						
	FETAL DEER									
	Squash fruit and seed		X							
	corn seed		X	X						
Spring	pepper seed									
	FISH									
	LIZARD			X						
	turtle			X						
	<i>digging sticks</i>									
	<i>milling stones</i>		X	X		X	X	X	X	X
	Amaranth seed		X							
	Mesquite seed									
	Grass seed	X	X	X	X					
	Setaria seed									
Winter	Cardon									
	Leucaena seed			X	X					
	Nopal		X	X						
	Pochote seed		X		X					
	TETECHU FRUIT									X
	Deer antler		X							
	COYOL FRUIT									
Fall	<i>no milling stones</i>	X								
	<i>no wet-season animals</i>	X						X	X	X
	COSAHIICO FRUIT		X							X

[illegible]

TABLE 26
Abejas Settlement Pattern Data
(Continued)

	Tc 272, Q	Tc 50, X, A-D	Tc 254, D	Tc 254, D West	Ts 388	Ts 386	Tc 307, C	Tc 307, B ¹	Tc 307, B	Tc 272, N, 1-2
COMPONENT DIMENSIONS										
axis	NS	EW	EW	EW	EW	NS	NS	NS	NS	NS
length in meters	11	15	10	4	300	100	6	6	10	14
width in meters	4	6	8	3	200	100	3	3	4	4
extent in sq. meters	40	72	80	12	60,000	10,000	18	18	40	50
SETTLEMENT FEATURES										
oval slab-lined pit house					2					
bundle burial (cremated)	2									
cache pit										
fire pit		1								
storage pit										
roasting pit			2							1
fired areas	1		2	1					1	
SETTLEMENT ARRANGEMENT										
Linear without plaza or mound					X(?)					
SETTLEMENT PATTERN TYPES										
Waterway hamlet					X					
Macroband dry-season camps										
possible dry-season cave camp										
possible dry-season open camp										
Macroband multi-season camps										
fall-winter-spring cave camp										
spring-summer-fall cave camp			X							
Macroband wet-season(s) camps										
spring cave camp										
wet-season open camp						X				
Microband multi-season camps										
year-round cave camp		X								
fall-winter-spring cave camp									X	
Microband wet-season camp										
wet-season cave camp							X	X		
spring cave camp				X						
Microband dry-season camp-winter										
possible dry-season cave camp	X									X
fall cave camp										
Microband dry-season water-source camp										

Tc 272, N ¹	Ts 51, C	Tc 7, level 4	Tc 50, IX, A-C	Ts 381e, B	Ts 375	Ts 253	Tc 272, M ¹	Tc 272, M	Tc 50, VIII, B,C,D	Tc 50, VIII, A	Tc 156	Tc 39, level 4,5	Tc 273	Ts 204	Tc 272, L, 1-2	Ts 367	Ts 368	Tr 349	Tc 266
NS 10 3 30	EW 50 10 500	EW 20 9 180	EW 15 6 90	EW 100 50 5,000	EW 100 40 4,000	NS 250 200 50,000	NS 7 4 28	NS 7 4 28	EW 16 5 80	EW 3 2 6	NS 9 4 36		NS 5 2 10		NS 16+ 6 65				10 5 50
1			1 3 5 1	1			2		1 1 ? X						2 2				
				?														?	
				X													X		
		X																X	
			X						X										
	X					X	X							X		X			
																			X
X							?	X		X		X		X					
											X	X							



Fig. 153. The reconstructed Ajalpan settlement pattern in the Tehuacan Valley.

The Purron and Ajalpan Settlement Pattern

The Purron Phase is inadequately represented, so that little can be said about the settlement pattern. All that now exist are three microband components, two of the summer and fall, and one of the spring, from Zones K and K¹ of Tc 272 in the Dissected Canyons. From the dam area of Purron Canyon (Ts 15) three Purron Coarse sherds collected from the surface hint that at least one other component, perhaps a hamlet, did exist, but we could not find it. In light of this inadequate data, let us pass on to the Ajalpan Phase.

The Ajalpan Phase is represented by fifteen components; only two were surface sites. Two of these, Ts 204B and Ts 4, seem to have been hamlets along waterways, the former in the Valley Center and the latter in the western Travertine Slopes. The other possible component is represented by a few Ajalpan Coarse and Red sherds from the arroyo of the Purron Dam (Ts 15). This component could not be found or classified. Ts 204 covered a relatively large elongate area (200 by 50 meters) paralleling the Rio Salado. Excavations at Ts 204 revealed a superimposed floor area, Zones H, G, G¹, F, F¹, and E, separated by layers of refuse. Zone H was charcoal-covered and in an ovoid basin about 8 meters long and 5 meters wide, and within it, in its north-central portion, was a roasting pit about 1 meter in diameter and 40 centimeters deep. Although we were able to discern only a single post hole at the south edge of the basin, the refuse included many burned chunks of wattle-and-daub, so we believe Zone H probably represents an ovoid or rectangular wattle-and-daub house. Capping this house floor was a rela-

tively thick layer of refuse (Zone G), which had an occupation feature in it, which, in turn, was capped by a burned clay and ash layer full of rock, wattle-and-daub, and artifacts which had extended down from two cache pits and a large roasting pit. The Zone G¹ extended over all the area to Ts 204D, Zone Sub-E, which we excavated and which was a definite lived-on floor. This, in turn, was capped by refuse, Zone F, with evidence of widespread occupations. Then there was another ash-charcoal floor (Zone F¹) over all our excavation with a cache pit extending down from it. Sherd studies reveal this floor was probably connected with Super-E of Ts 204D, 30 meters to the east, which had another pit extending down from it. It might be added that both pits contained quantities of burned wattle-and-daub. These floors were in turn covered by refuse (Zone E of Ts 204 and Zone D of Ts 204D) and again in a small patch in our excavation a floor composed of burned clay and wattle-and-daub capped this refuse. This floor seems to be earlier than a large bell-shaped burial pit to the south of our excavation, which contained huge chunks of burned wattle-and-daub, one of which had red paint on it. Excavations in the lower strata of Ts 368e, also in the Valley Center Steppe, revealed definite floors of four hamlets of only slightly smaller size (50 by 150 meters). The lowest zone, K³, was capped by three patches of burned clay and ash. Since two of these patches were rectangular in outline (about 5 by 3 meters) and contained most of the artifacts as well as wattle-and-daub, we consider them to represent rectangular wattle-and-daub house floors,

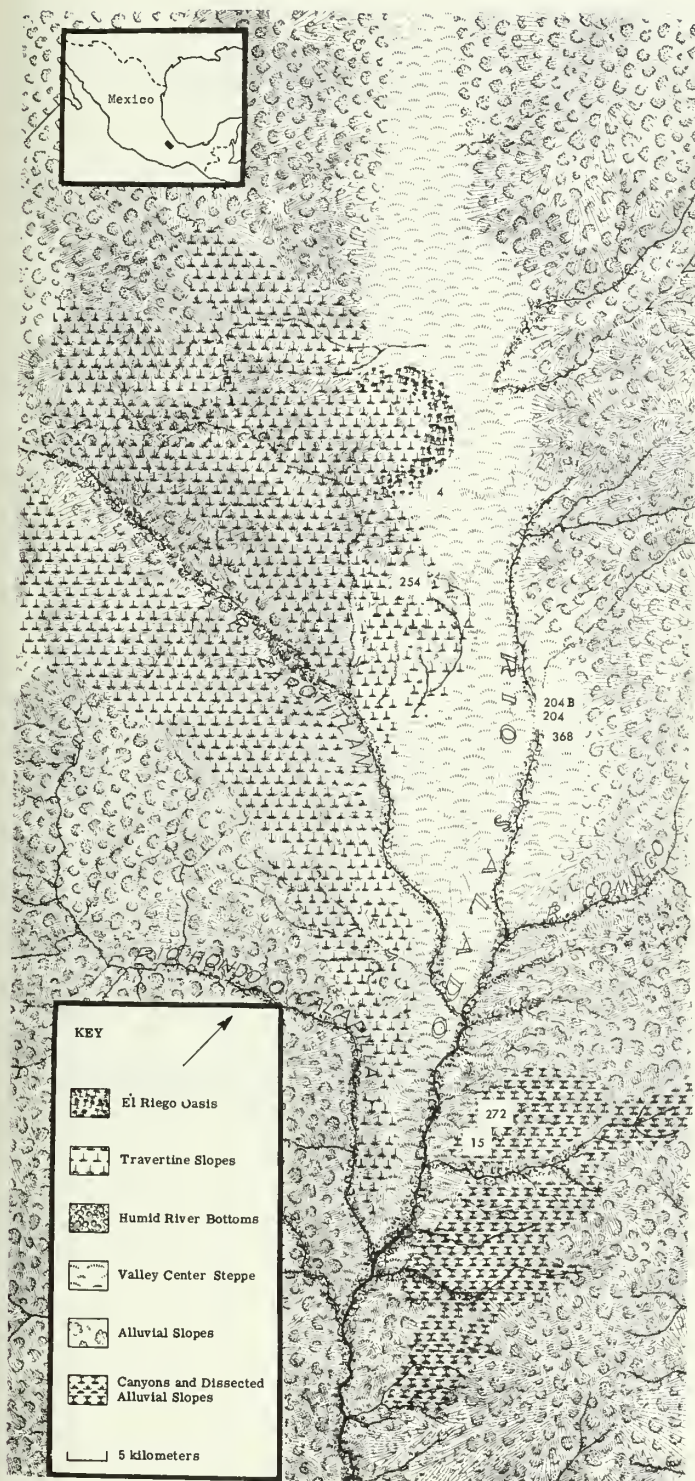


Fig. 154. An ecozone map of numbered Ajalpan sites in the Tehuacan Valley.

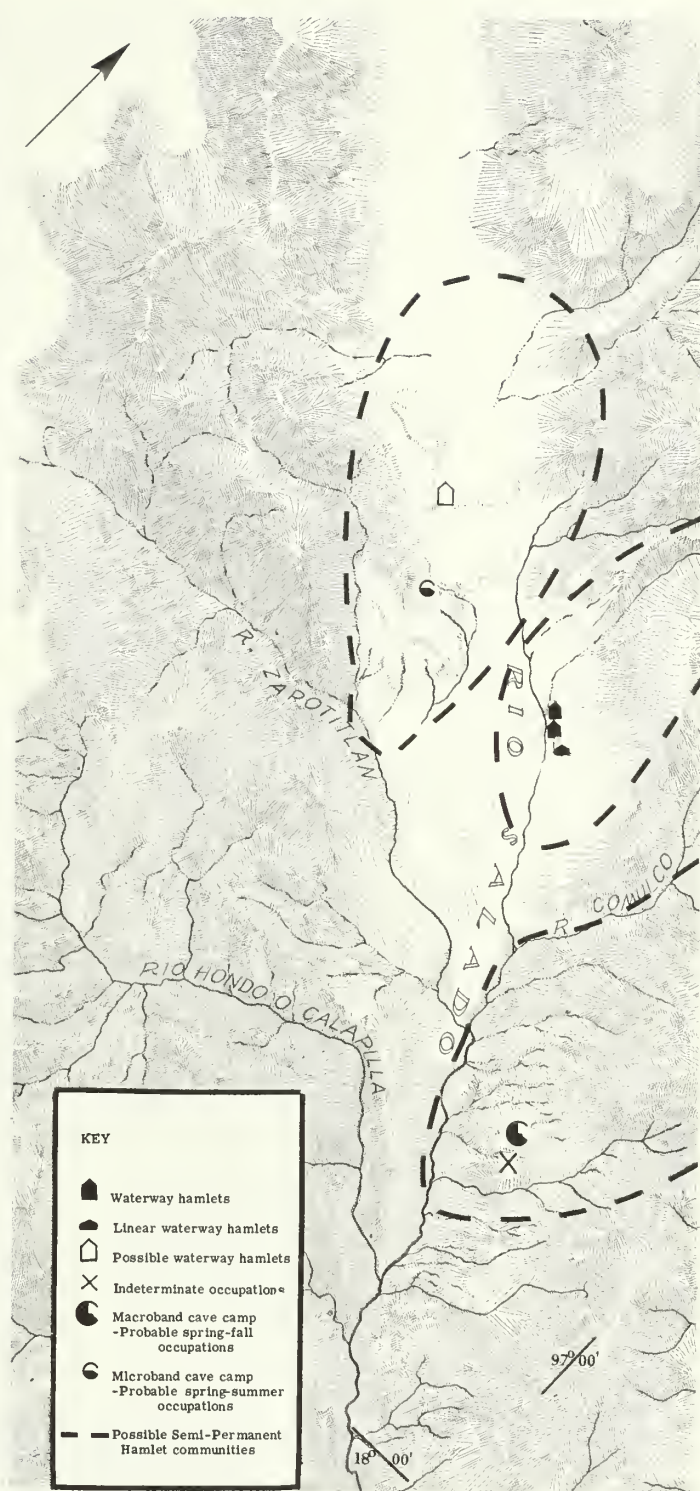


Fig. 155. Map of Ajalpan settlement pattern types in the Tehuacan Valley.

TABLE 27
Purron and Ajalpan Settlement Pattern Data

		Purron			Early Ajalpan				
		Tc 272, K, south 2	Tc 272, K, north 1	Tc 272, K ¹	Ts 204, H	Tc 272, J, 1-3	Ts 204, G	Ts 204, G ² Ts 204D, sub-E	Ts 204, B
MICRO-ENVIRONMENTS									
Travertine Slopes									
arroyo flanks									
Valley Center Steppe									
humid river flanks					X		X	X	X
Canyons and Dissected Alluvial Slopes									
canyon flanks		X	X	X		X			
SEASONALITY									
Fall	{	X		X					
CHUPANDILLA FRUIT									
SAPOTE FRUIT									
Squash fruit and seed									
Summer	{	X		X		X			
Corn seed									
LIZARD							X		
TURTLE					X		X	X	
<i>digging sticks</i>			X			X			
<i>milling stones</i>		X		X	X	X	X	X	X
Spring	{								
Mesquite seeds and pods									
Grass seed						X			
Leucaena seed									
Pochote seed			X						
TETECHU FRUIT									
Winter	{								
Deer antler					X			X	
COYOL FRUIT			X			X			
Fall	{					X			
COSAHIICO FRUIT									
COMPONENT DIMENSIONS									
axis		NS	NS	NS	NS	NS	NS		NS
length in meters		9	6	7	100	17+	100	40	200
width in meters		4	4	4	20	5	20	130	30
extent in sq. meters		c.35	c.18	c.25	2000	c.80	2000	5200	6,000
SETTLEMENT FEATURES									
houses (post-hole)					1?			2	
length in meters					8			4	
width in meters					5			2	
burial (bell-shaped pit)									
wattle-and-daub					X		X	X	
burial (extended)									
cache pit						1	1		
fire pit		1	1	2		1			
roasting pit		1			1	2		2	
fired area						1			
SETTLEMENT ARRANGEMENT									
linear without plaza or mound					X		X	X	X?
SETTLEMENT PATTERN TYPES									
Linear waterway hamlet					X		X	X	X
Macroband multi-season camps									
probable spring-summer-fall cave camp						X			
Microband multi-season camps									
probable spring-summer cave camp			X						
probable summer-fall cave camp		X		X					

Late Ajalpan									
Tc 254, C	Ts 204, D, E Ts 204, F	Ts 204, F ¹ Ts 204D, super-E	Ts 368e, K ³	Ts 368e, K ²	Ts 204C, pit Ts 204D, C	Ts 204, E Ts 204D, D	Ts 368e, K ¹	Ts 368e, J	Ts 4
X	X	X	X	X	X	X	X	X	X
X X X	X			X			X		
X X X X X X	X	X	X	X	X	X	X	X	X
	X	X	X						
EW 2 60 1 150 2 9000	NS 150 50 7500	EW 100 50 5000	EW 100 50 5000	100 40 4000	NS 100 40 4000	EW 150 50 7,500	EW 150 50 7,500	EW 100 50 2,000	
	1 4 2	2 5 3	3 4 3			2 6 4	2 6 3		
X 1	X 3	X 1	X 1	X	X	X 3?	X		
		1			X	1			
X	X	X	X	X	X	X	X	X	X?
	X?	X	X	X	X	X	X	X	X?
X									

even though our excavators were not skilled enough to recognize the post holes. The other burned patch seemed to be some sort of roasting area. Zone K² was capped by three rectangular patches of burned clay with similar associations, which we also considered to be three houses in a line. Zone K¹ was similar, with two house floors capping it, and Zone J had two rectangular house floors on its surface, which were aligned in the same direction as the others. Since a test, some 50 meters to the east, revealed four zones like K³, K², K¹, and J, we assumed that the hamlets about covered the area on which we found Ajalpan sherds, roughly 150 by 50 meters. It might be added that alignment of the houses in our four floors is the same as that of the main axis of the Ajalpan refuse area, that is, from northwest to southeast. These four floors are thus considered part of linear waterway hamlets. Thus, there is good evidence for eleven waterway hamlet components with the possibility that there were two more.

The other two Ajalpan components are from caves, one in the Dissected Canyons (Zone J of Tc 272) and one in the western Travertine Slopes (Zone C of Tc 254). Zone J of Tc 272 had a definite floor that covered at least 80 square meters with two roasting pits, a fire pit, a cache pit, and a charcoal area. This suggests a macroband or macrobands occupation. The seasonal indicators suggest the latter, with a macroband spring planting group who returned to harvest the corn crop in the fall. The remains in Zone C of Tc 254 came from two square meters of the cave and were not connected with a floor; certainly this occupation must have been by a very small group. Again, the plants and artifacts suggest a spring planting foray and summer harvesting visit.

Obviously, Ajalpan, with thirteen hamlet occupations and a microband and a macroband camp, is radically different from Abejas, with its basically seasonal occupation, and it is difficult to discern population changes from one to the other on the basis of site size, for Abejas people occupied a number of different locations per year that were probably different from one year to the next, while Ajalpan people remained in one spot all year long for a series of consecutive years. Further, the early Ajalpan (1500 to 1100 B.C.) sites (5) are meagerly represented, so any figures of area occupied are meaningless. Perhaps the best one can do is to note the extent of the ten components of Late Ajal-

pan (1100 to 850 B.C.), which is about 51,502 meters or about 20,600 square meters per century, and compare the latter figure with the per-century occupation of Abejas, that is, 16,000. This might indicate a doubling of population, similar to that which occurred from El Riego to Coxcatlan and from Coxcatlan to Abejas. Our guess would then be that Ajalpan population was somewhere between 600 and 1200 people. Perhaps a better estimate might be made based upon our calculation from the area occupied by houses at Ts 368e, which is about 12 by 8 meters for houses that are roughly 5 or 6 by 3 or 4 meters in size. This would give us about 78 houses from Coatepec that covered about 7,500 square meters, or 312 people for the village if four people, a family, lived in each house. Pushing the data even further, and assuming that there were four contemporaneous villages (Ts 204B, Ts 204, and Ts 4, as well as Ts 368e) covering 25,500 square meters at one time, would lead to a figure of 265 houses or 1060 individuals. Obviously, any estimate of population based on the present situation in Tehuacan is most unreliable, and must remain as such until excavation reveals sites for which good house counts can be made. However, in spite of the unreliability of our population guestimates, it does seem that the Ajalpan population had increased over that of Abejas.

Ajalpan shows evidence of economic seasonality and scheduling, but with no major population movements. All the hamlets evidence year-round occupations and our microband and macroband occupations seem to be brief forays out from hamlets to plant and harvest in spring and summer. Further, preserved food remains in the latter macroband occupation indicate intensive barranca agriculture during the wet season with little hunting or collecting. Five of the hamlet floors had hardened winter antler, indicating that most of the hunting from the hamlets occurred during the dry season.

Our sites are not very numerous at this period, only six or seven, but they do seem to form three clusters, one in the Travertine Slopes, one in the Valley Center Steppe, and one in the Dissected Canyons. These are considered to compose three *Semi-Permanent Hamlet Communities*.

Indeterminate Occupations

Ts 15 (Late Santa Maria Phase) is described below.



Fig. 156. The reconstructed Early Santa Maria settlement pattern in the Tehuacan Valley.

The Early Santa Maria Settlement Pattern

Our sample of thirty-two Early Santa Maria components is better than that of Ajalpan, but still far from adequate. Ten sites had a few sherds of diagnostic Early Santa Maria types (Canoas White, Canoas Orange-brown, and Canoas Heavy-plain) mixed in with many sherds of later phases and associated with later constructed and occupied architectural features. We consider that these few sherds represent some sort of an Early Santa Maria occupation of an indeterminate type at sites Ts 450, Ts 452, Ts 67 in Lencho Diego Canyon, and Ts 146, also in the Dissected Canyons, and at Tr 25, Tr 366, Tr 251, Tr 168, and Tr 212 in the Valley Center Steppe, and Ts 223 in the eastern Alluvial Slopes. Like the above, Ts 204 and Ts 204B in the Valley Center also had later and earlier period sherds, mixed with Early Santa Maria sherds, but in these sites the Canoas types were extremely numerous and were associated with wattle-and-daub, as well as cut masonry slabs or blocks. For this reason, we believe these latter two sites might possibly be hamlets. Better evidence of a hamlet comes from Tr 449, in Lencho Diego Canyon next to Purron Cave, where Canoas sherds were picked up in and around two rectangular house foundations (3 meters by 2 meters) made of cut masonry slabs. The best evidence of hamlet occupations comes from the Valley Center, Ts 367, whose excavation revealed Zones C, D¹, and D² as charcoal floors with wattle-and-daub and cut slabs and abundant Early Santa Maria pottery. Equally good evidence of floors with wattle-and-daub, hearths, and dry-laid slab masonry walls came from the Early Santa Maria zones, C¹, C², D, E, F, G, H, and I of nearby Ts 368e.

These, also, could be hamlet floors, but on the east end of Ts 368 is a huge earth mound more than 20 meters in diameter and over 8 meters high, with Canoas pottery, and we believe these floors are associated with this structure. Thus, these occupations are considered village occupations, a village defined as "a group of permanent habitations oriented to a religious (mound), administrative, or economic center with a limited number of full-time specialists." Four other possible Early Santa Maria villages were found in the survey. One was Tr 15 in Purron Canyon which had a small mound of undetermined size surrounded by a 50-meter in diameter area of Canoas type sherds. In the Valley Center Steppe, Tr 278 had two parallel truncated dirt pyramids (20 by 20 by 1) in the center of a 100-meter-diameter area of Early Santa Maria sherds, and Tr 369 had a single dirt mound (20 by 8 by 3 meters high) in an elongated (200 by 100 meters) Canoas sherd area, while Tr 363 had 3 squarish mounds (10 by 10 by about 1.5 meters) forming a U-shape plaza open to the west in the center of a Canoas sherd area about 150 meters in diameter. The final two components of Early Santa Maria were both from Zone I, a definite floor in Purron Cave (Tc 272) in the Dissected Canyon micro-environment. One small 6-meter-square area in the north part of that floor had only mesquite pods, grass and pochote pods, all spring plants, and we have classified it as a spring microband camp. The whole floor over 100 square meters with 1 fired area and 2 roasting pits and corn (summer) and chupandilla and cosa-huico (fall) fruits was classified as a summer-fall macroband occupation. There is, also, one other feature,

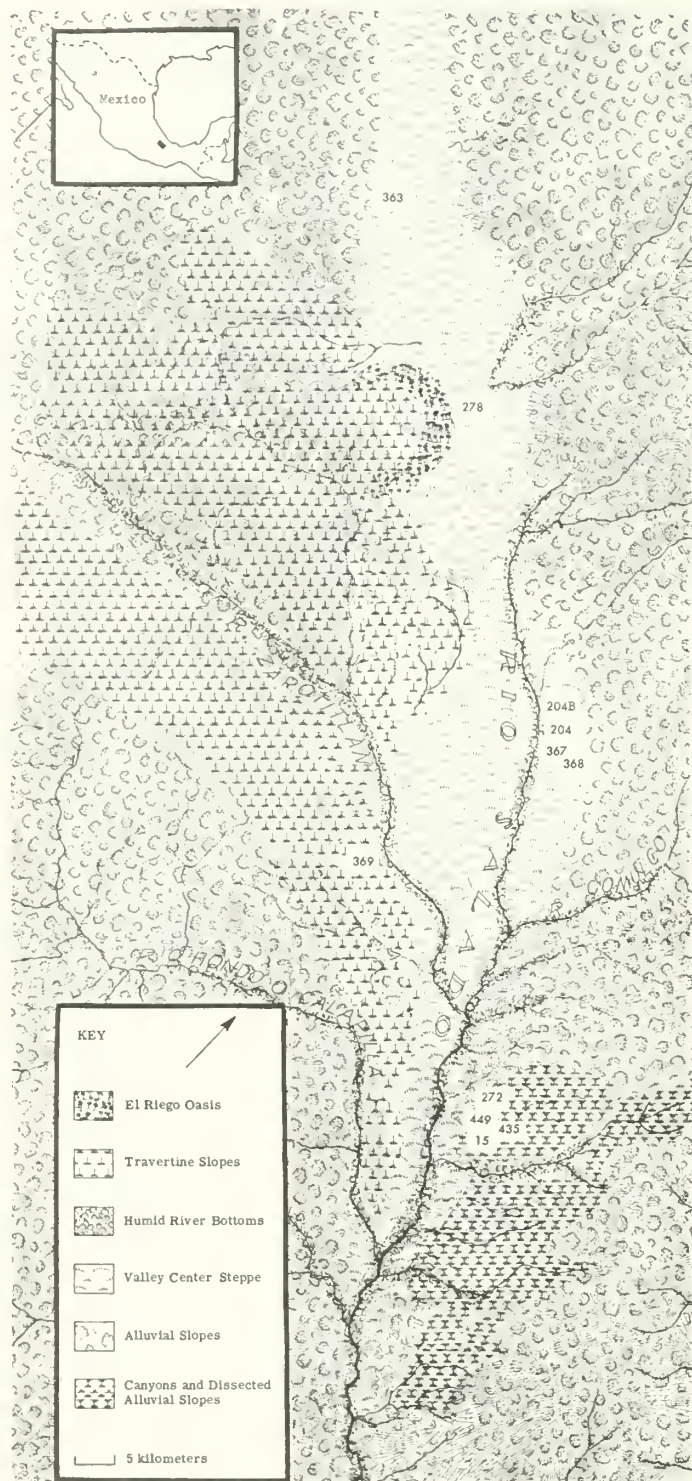


Fig. 157. An ecozone map of numbered Early Santa Maria sites in the Tehuacan Valley.

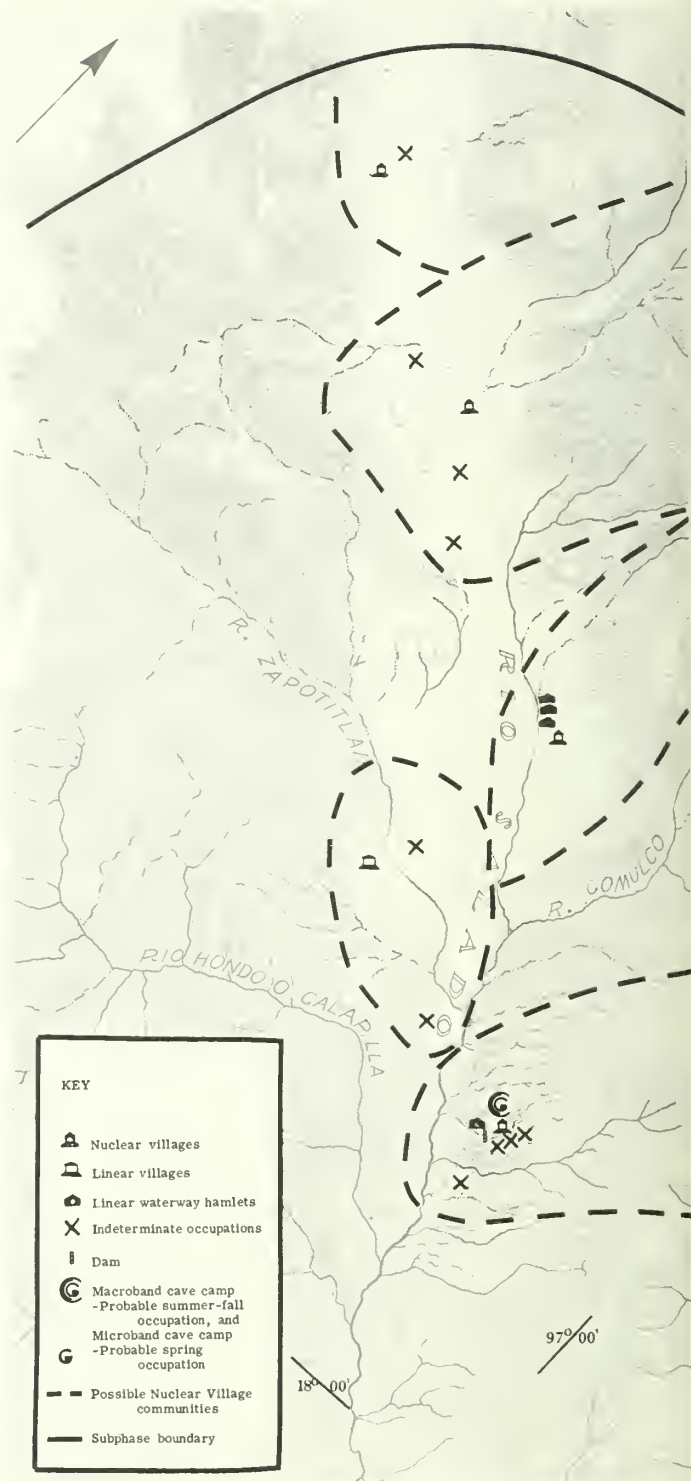


Fig. 158. Map of Early Santa Maria settlement pattern types in the Tehuacan Valley.

not strictly a settlement, worth mentioning, and this is Ts 435, the first stage of Purron Dam, which was about 100 meters long, 10 meters wide, and 2 meters high.

Definite settlements, then, are a microband camp, a macroband, nine or ten hamlets, and seven village components, as well as the dam, and ten indeterminate occupations. We estimate that eight definite sites (Ts 368, 20,000; Tr 363, 22,500; Tr 278, 20,000; Tf 367, 25,000; Tc 272, 106; Tr 15, 2,500; Tr 449, 1,500; Tr 369, 20,000) cover about 111,606 square meters and, of course, the indeterminate occupations must have covered incalculable additional areas. However, even the figure of definite site extent is over twice as large as that of Ajalpan (ca. 51,000 square meters) so there are hints that the increase from Late Ajalpan to Early Santa Maria is greater than it had been between the three previous phases. On this basis one might speculate that the population of Early Santa Maria was between 1800 and 3600 people.

However, it was the relationship of the settlements to each other and to the micro-environs, and the configuration of the settlements themselves, that had more significant cultural implications than did the increased population size and new kinds of settlements. Early Santa Maria settlements occur in only two micro-environments—the Dissected Canyons and the Valley Center Steppe—a single cluster of settlements in the former and four in the latter.

The single cluster in Lencho Diego Canyon of the Dissected Canyons micro-environment was composed of a nuclear village site, a mound with refuse (and probably habitations) arranged around it, a hamlet consisting of two masonry houses arranged in linear fashion at the edge of the arroyo, two cave occupations, three elongate areas of refuse along the arroyo bank, which included Early Santa Maria sherds and were perhaps linear hamlets, and a 100-meter-long dam across the arroyo. The nearby site, Tr 146, on a hill in the steppes of the Valley Center, containing a few Canoas sherds, might have been some sort of occupation associated with this cluster. Probably the main reason this cluster occurred in this locality was the dam that gave the inhabitants a stable water supply for agriculture. Further, the hamlet, microband and macroband occupations, as well as four indeterminate occupations, seem to be oriented to the nuclear village which was certainly the ceremonial center of the community, and, possibly, also the economic and administrative center.

A second very obvious community is in the center of the Tehuacan Valley along the banks of the Rio Salado, a permanent source of water for agriculture and

other purposes. Here, three linear riverbank hamlets seem to be associated with and oriented to an area of habitations surrounding a large pyramid, a nuclear village (Ts 368). The third community along the Zapotiltan River, although with less well-defined settlements, may have been similar, for here we found an elongate site with a single mound—a linear village—and two waterway locations, perhaps hamlets, which included Canoas sherds.

The other two clusters of sites are both rather different. Both have a single village, but the northern village has three dirt truncated pyramids forming a U-shape plaza open to the west, while the southern village has two parallel north-south oriented dirt truncated pyramids, but they are in the grassland steppes of the Valley Center micro-environment, not along waterways. Further, the single indeterminate site in the northern one and the three indeterminate sites in the more southerly cluster are also in the grassland area rather than along waterways. However, the alignment of the four sites of the southerly group, along the present Valsequillo irrigation canal and all near the El Riego springs, and the arrangement of the other two directly in line with the arroyo, east of Tlacotepec, does suggest that perhaps all the sites were along some sort of relatively short, man-made water system or canal. This use of canals would not be too surprising in light of the finding of short canals of this age in nearby Oaxaca.

Thus, in spite of the differences in the number of mounds and arrangement of dirt-surface truncated pyramids in the villages, the size of sites, the number of undefined sites, and the use of three different parts of two micro-environments, all communities have occupations along waterways and series of small linear occupations (often hamlets) associated with a single concentric village. For these reasons we have classified the communities as being of the *Nuclear Village* type.

The distribution of sites with Early Santa Maria pottery, also, revealed one other aspect related to the settlement pattern. Tr 40 and Tr 360, both just north of our northernmost community, near San Hipolito and Tecamalcho, respectively, had a few Canoas sherds associated with large quantities of contemporaneous Zacatenco and Puebla pottery. These sites, we believe, belong to another unnamed cultural phase, not Santa Maria, and thus mark off the northern border of the Santa Maria Phase. No such boundaries, if there are such, were found to the east, west, or south.

The Survey Sites

Tr 363. This site is located in the extreme northwesternmost portion of the valley, about 1 km. northwest of

TABLE 28
Early Santa Maria Settlement Pattern Data

		Ts 368e, I	Ts 368e, H	Tr 363	Tr 278	Ts 368e, G	Ts 368e, F	Ts 368e, E
MICRO-ENVIRONMENTS								
	Valley Center Steppe							
	humid river flanks	X	X			X	X	X
	steppes			X	X			
	Canyons and Dissected Alluvial Slopes							
	canyon flanks							
SEASONALITY								
Fall	{ CHUPANDILLA FRUIT							
	{ Corn seed							
Summer	{ <i>milling stones</i>	X	X	X	X	X	X	X
	{ Mesquite seed							
Spring	{ Grass quids							
	{ Pochote pods							
Winter	{ Deer antler	X	X					
Fall	{ COSAHUICO FRUIT							
COMPONENT DIMENSIONS								
	length in meters	200	200	150	100	200	200	200
	width in meters	100	100	150	200	100	100	100
	extent in sq. meters	20,000	20,000	22,500	20,000	20,000	20,000	20,000
SETTLEMENT FEATURES								
	wattle-and-daub	X	X	X		X	X	X
	houses (post-hole)	2		1?		X1?	1	
	houses (masonry)	1?	1?			?	1?	?
	length in meters	6	?	6			6	?
	width in meters	3	4	3			3	4
	mounds			3	2			
	length in meters			10	20			
	width in meters			10	20			
	height in meters			1.5	1			
	plazas							
	parallel				NS			
	U-shaped			W				
	extended burial	1						
	dam							
	roasting pit						1	
	fired area							1
SETTLEMENT ARRANGEMENT								
	concentric with plaza or mound			X	X			
	linear with plaza or mound							
	linear without plaza or mound	X	X			X	X	X
SETTLEMENT PATTERN TYPES								
	Nuclear (valley) village			X	X			
	Linear (waterway) village							
	(Linear) waterway hamlet	X	X			X	X	X
	Macroband multi-season camps							
	summer-fall cave camp							
	Microband wet-season camps							
	spring cave camp							

Ts 367, D ²	Ts 367, D ¹	Ts 367, C	Ts 368e, D	Tc 272, I, 1-2	Tc 272, I, 1	Ts 368e, C ²	Ts 368e, C ¹	Ts 435	Tr 15	Tr 369	Tr 449	Ts 368w, E Ts 368e, C	Ts 204	Ts 204, B
X	X	X	X			X	X			X		X	X	X
				X	X			X	X		X			
X	X	X	X	X	X X X X X X X	X	X					X		
				X	X									
100 50 5000	100 50 5000	150 100 15000	200 100 20,000	15 5 76	6 5 30	200 100 20,000	200 100 20,000	100 10 1,000	50 50 2,500	200 100 20,000	50 30 1,500	200 100 20,000		
X X 1? 6 3	X X	X X	X X			X X	X X					X X		
									1	1 20 8 3	2 3 2	1 40 ? 1		
			1	1 1	1		3	X						
X	X	X	X			X	X		X			X		
										X				
X	X	X	X			X	X		X ?	X	X	X	X	X
				X										
					X									

Santa Maria la Alta and about 3 kms. south of Tlacotepec. It is in the flat grassy plain west of the main irrigation canal with the nearest source of natural water being the springs at Tlacotepec.

Tr 278. These two mounds are in the plains just north of Tehuacan on the east side of the present main irrigation canal and east of Pueblo Madero at Rancho Carnero.

Tr 369. Sherds were found along and in a 50-cm.-thick stratum eroding out of the banks of a small arroyo flowing into the Rio Zapotitlan from the south, about 1 km. east of Teotitlan in the east-central part of the valley.

Tr 449. These architectural features were eroding out of the north bank of the Arroyo Lencho Diego, just below (100 meters) Purrón Dam in the southeast portion of the Tehuacan Valley.

Tr 435 and *Tr* 15 are described in Volume 4 of this series.

Tc 272, a stratified cave, is described in Chapter 3.

Tr 368, *Tr* 367, and *Ts* 204, stratified sites, are described in Chapter 5.

Indeterminate Occupations

Tr 25, *Tr* 450, *Tr* 67, *Ts* 366, *Tr* 452, and *Tr* 212 (Late Santa Maria Phase) are described below.

Ts 146 and *Tr* 251 (Early Palo Blanco Phase) are described below.

Ts 223 (Late Palo Blanco Phase) is described below.

Tr 168 (Early Venta Salada Phase) is described below.

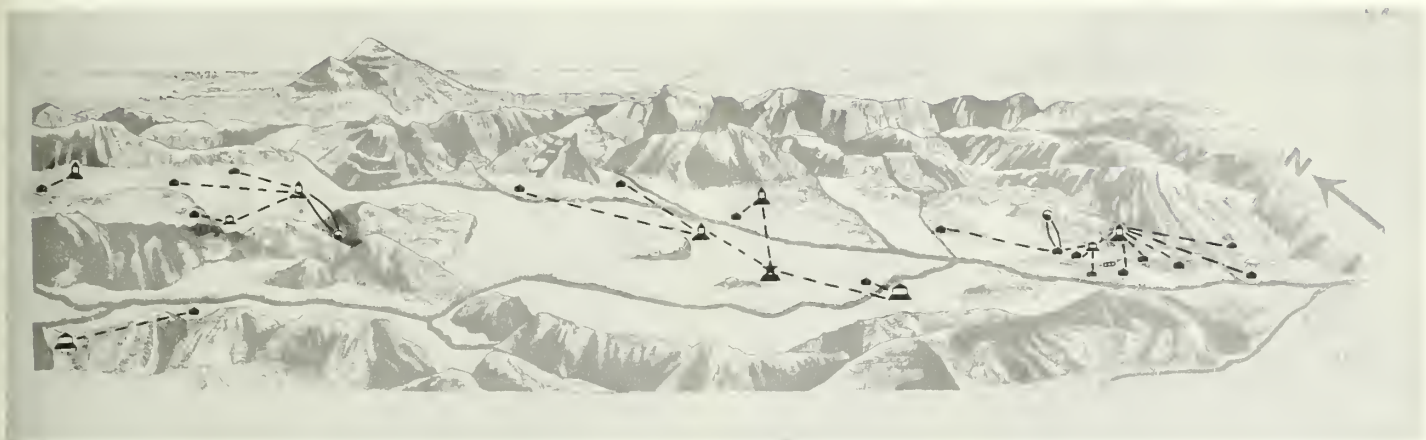


Fig. 159. The reconstructed Late Santa Maria settlement pattern in the Tehuacan Valley.

The Late Santa Maria Settlement Pattern

Fifty components from the thirty-eight sites of Late Santa Maria reveal a slight increase over Early Santa Maria which had thirty-two components from twenty-one sites. When we consider that twenty Late Santa Maria sites had indeterminate occupations, and only nine Early Santa Maria occupations were indeterminate, the difference in actual number of occupied sites is only eight. There is very little difference in short-term occupations, for Late Santa Maria had a spring-summer-fall microband camp, three summer-fall encampments, a winter-spring occupation, a spring camp, and an indeterminate one from three different sites; while Early Santa Maria had a microband and a macroband occupation from only one site. The number of hamlet components dropped to about half in Late Santa Maria (Tr 450, Tr 67, Ts 376, Tr 235, Ts 204, and Ts 212), while Early Santa Maria had eleven waterway hamlets, three of which were excavated at Ts 367 and five at Ts 368e. Village occupations in Late Santa Maria numbered thirteen to fifteen from eight sites, and the early part of the phase had eight village occupations from six sites. Purron Dam was also rebuilt twice in the later part of the phase. Also, only three villages had single dirt pyramids like three of Early Santa Maria, none had two parallel mounds like one of Early Santa Maria, and while only one Early Santa Maria site had three small mounds forming a U-shape plaza, two late Santa Maria sites (Tr 25 and Tr 366) had U-shape plazas surrounded by four huge mounds, while another site, Tr 243A, had one enclosed plaza surrounded by four huge dirt pyramids, and Tr 15 was at this time a causeway that had at least three

aligned pyramids on it. As has been noted previously, excavations of pyramids at Tr 368 and Tr 218 of Late Santa Maria give us some inkling as to the construction of their truncated pyramids. Most are rubble and/or dirt-filled with their steep, or only slightly inclined, walls, faced with oval or loaf-shaped boulders (or loaf-shaped adobe bricks), and these steep faces were usually plastered with a thin layer of mud or clay. Also, there seems to have been a single set of less steeply inclined steps made of flat rock slabs that extended out from one of the longer sides of the truncated pyramids. Whether the construction of Early Santa Maria truncated pyramid was the same or not could not be determined, but we would guess it might have been similar.

Perhaps the most distinctive aspect of the Late Santa Maria settlement pattern was the first occurrence at Tr 218 of a type we have called a town. By "town" we mean a large permanent settlement of two or more plazas with central administrative or ceremonial areas that include or are surrounded by a variety of other structures showing some evidence of housing many full-time specialists. Tr 218, covering over 120,000 square meters, had an inner U-shape plaza with three truncated pyramids encompassed by a square causeway with nine mounds on it, and then two pyramids to the east of the square causeway. The varied size of the pyramids and plazas, specialized artifacts, as well as burials of seeming specialists, allow it to be classified as a Nuclear (Valley) Town.

Nevertheless, in spite of this one example of a new large settlement type, the change from Early to Late

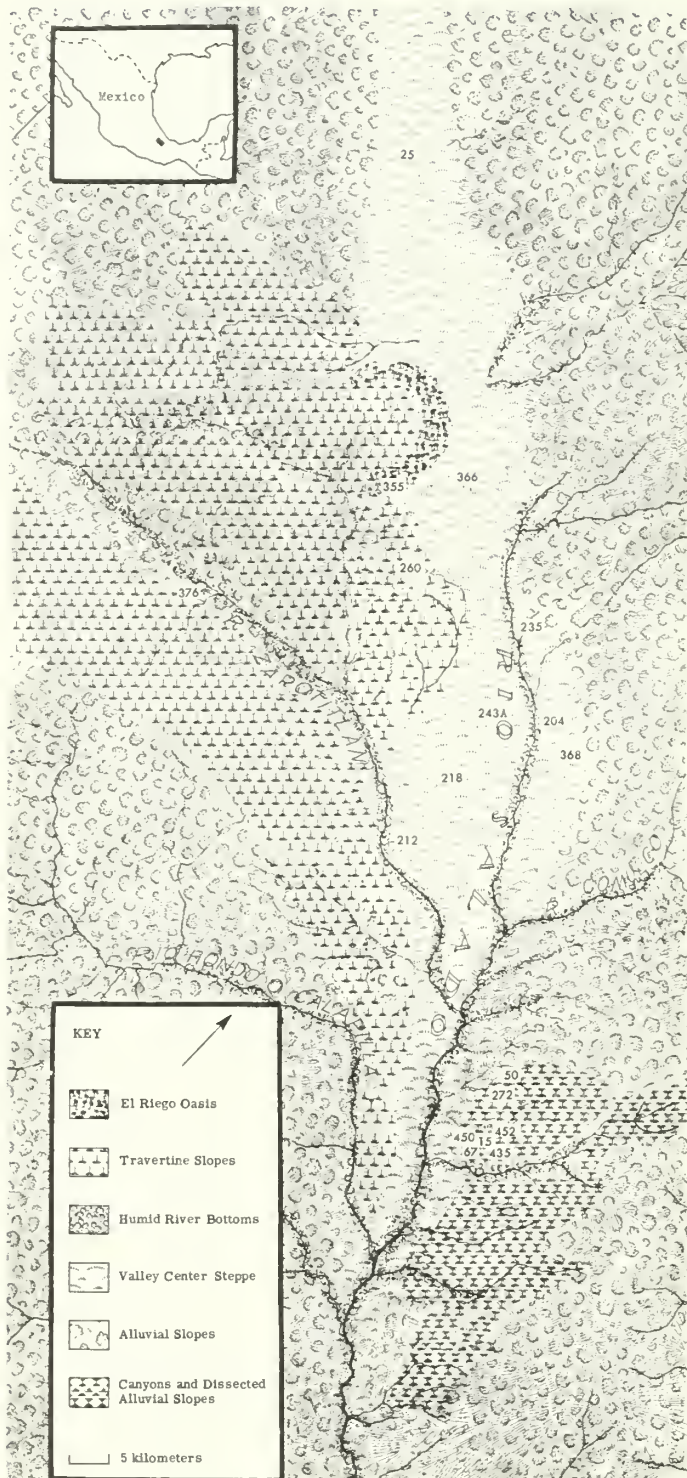


Fig. 160. An ecozone map of numbered Late Santa Maria sites in the Tehuacan Valley.

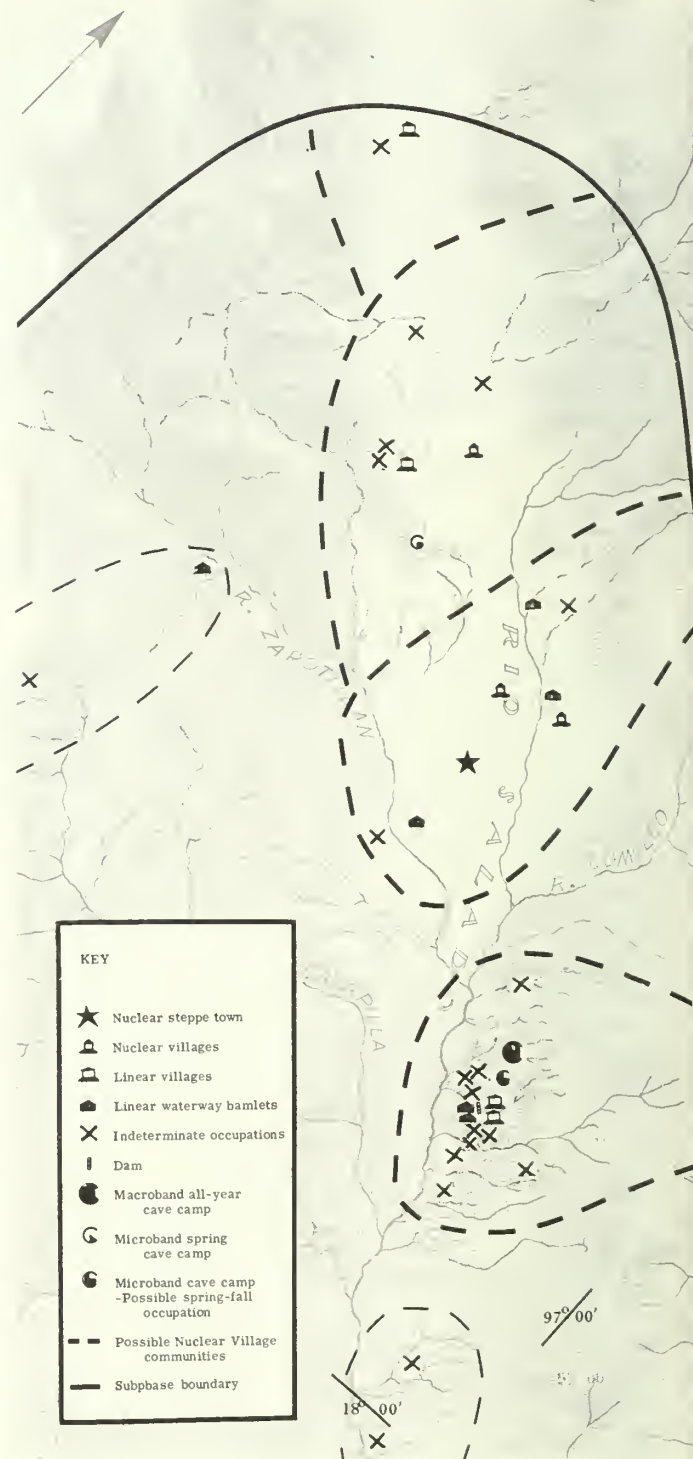


Fig. 161. Map of Late Santa Maria settlement pattern types in the Tehuacan Valley.

Santa Maria seems to have been a sudden or marked increase. In terms of areas covered by residential sites, Late Santa Maria had an increase to 572,680 square meters from the 111,606 square meters of Early Santa Maria. Perhaps the population of the valley was now between 5000 and 8000 individuals.

The clustering of Late Santa Maria sites is also not very different from that of the early part of the phase, for they mainly occur in the same two micro-environments, the Valley Center and the Dissected Canyons, and are about the same number, five or six; although of course, sites within each of the clusters are more numerous and larger than the earlier ones. The northernmost cluster in Late Santa Maria, with a single village with a more linear outline and an indeterminate site, is exactly the same as the earlier one, but it may be that the site with three mounds now classified as indeterminate, because of limited Late Santa Maria sherds, which was the nuclear village site in the earlier part of the phase, continued as a village in later times, only with more limited population. Again, both the sites' positions in the steppes suggest some sort of a water-control technique.

The next most northern cluster for the late part of the phase, is, also, similar, but Tr 366 in the valley steppes, which was classified as an indeterminate site in the early part of the phase, has now grown into a huge nuclear village with a central U-shape plaza surrounded by four large mounds. Also, a linear village with a single mound now occurs at the flanks of the valley. Whether Tr 278, nearby in the steppes, continued as a small village, or had shrunk to some sort of smaller occupation, could not be determined. Again, all three of these sites would have required water to be brought into them. The other reliably classified site in this area is a wet-season cave camp in San Marcos Canyon. The other three sites having some Late Santa Maria sherds on them were mainly occupied and built during later phases and all represent a different settlement pattern since they are on hilltops in the western Travertine Slopes. Exactly what kind of occupation they represented could not be determined and they might be the beginning of the new settlement pattern that is popular in the following Early Palo Blanco Subphase.

The central part of the valley cluster that was represented by two clusters in the early part of the phase has now expanded into one of the major communities of the valley. Seemingly, the nucleus of this community was the large town site in the center of the Valley Steppe, Tr 218. Nuclear village sites seemingly oriented to this center would be a new site, Tr 243, also in

the valley steppes, as well as the previously occupied site, Tr 368, along the banks of the Rio Salado. The four linear hamlets, two of which were occupied previously, are also along the banks of streams or arroyos. The other two sites, both along streams, had indeterminate types of occupations and one of these, Tr 369, had been a linear-shaped village with a single mound in the previous subphase, and, of course, could have continued as such. Again, it must be pointed out that the two largest sites, Tr 218 and Tr 243, are far from water, and their position in the steppes suggests that they received some sort of canal irrigation.

The final major community is in the south-central part of the valley and seems to be centered around two linear-shaped villages above the lake, impounded by the much expanded Purron Dam in Lencho Diego Canyon in the Dissected Canyons micro-environment. Just below the dam were two small linear hamlets and Tr 449, which was classified a linear hamlet in Early Santa Maria times. There, also, were three cave occupations, two microbands, and one all-year-round macroband encampment. The other sites in this cluster contained a few Late Santa Maria sherds mixed with many others of later periods and associated with architectural features built at later times. Five, Tr 73, Tr 77, Tr 80, Tr 82, and Tr 145, were on hilltops in the Dissected Canyons micro-environment, and two (Tr 140 and Tr 146) were on hilltops in the Valley Center, while these were also in the latter zone but out in the steppes.

The other two clusters are very poorly defined and perhaps represent the peripheries of communities outside our area of exploration. The southernmost one consists of two sites, Tr 304 and Tr 299, that were mainly occupied during later times; the former is on the flanks of the eastern Alluvial Slopes, while the latter is along the Rio Salado in the Valley Center zone. The other cluster is in the western Travertine Slopes and is represented by a single hamlet along the Rio Zapotitlan and a few sherds on a hilltop site, Tr 356.

However, in spite of these latter two clusters, the pattern of communities seems to be camps, hamlets, and villages clustered around and oriented to a nuclear village, or, in one case, to a nuclear town. Thus, we have classified these communities as being of the *Nuclear Village* type like those of Early Santa Maria.

Our survey also revealed one other significant set of facts about this Late Santa Maria Subphase, for Tr 40, Tr 360, and Tr 361, at the north end of our valley contained a few Late Santa Maria sherds with many foreign sherds of the same time period. Thus, the northern boundary of the phase is just north of our

TABLE 29
Late Santa Maria Settlement Pattern Data

	Tr 368e, C Tr 368w, E	Tr 368w, D Tr 368e, D ¹	Tr 368w, C Tr 368e, B	Tr 25	Tr 450	Tr 67	Tr 15	Tr 452	Tr 435	Tr 366	N mound	E mound	SE	SW
MICRO-ENVIRONMENTS														
Travertine Slopes														
arroyo flanks														
slopes														
Valley Center Steppe														
humid river flanks	X	X	X											
steppes				X						X				
Canyons and Dissected Alluvial Slopes														
canyon flanks					X	X	X	X	X					
COMPONENT DIMENSIONS														
length in meters	600			400	40	40	80	60		400				
width in meters	200			100	20	20	20	20		400				
extent in sq. meters	120,000			40,000	800	800	1,600	1,200		16,000				
SETTLEMENT FEATURES														
extended burials														
wattle-and-daub	X	X	X	X							X			
houses (post-hole)	?	1	?											
length in meters		8												
width in meters		4												
houses (masonry)	2	X	X		1	X	X	X						
length in meters					8									
width in meters					4									
pyramids (steep earth-covered boulder)	1	1	X	4			3	1			4			
length in meters	30+			50			16	20			100	30	30	25
width in meters	Q			30							40	30	15	15
height in meters	1			3-5							8	?	3	3
axis	EW			NS							EW	NS	EW	EW
steps	1			?										
causeway														
length							200							
width							20				X			
plazas														
length in meters				60										
width in meters				60										
U-shaped				X							X			
opening				W							W			
enclosed	X	X	X											
parallel														
dam										2				
length										200				
width										20				
height										6				
SETTLEMENT ARRANGEMENT														
concentric with nested plazas														
concentric with plaza or mound	X	X	X							X				
linear with plaza or mound				X			X	X						
linear without plaza or mound				?	X	X								
SETTLEMENT PATTERN TYPES														
Nuclear steppe town														
Nuclear (valley) village	X	X	X							X				
Linear (waterway) village				X			X	X						
(Linear) waterway hamlet					X	X			?					

northernmost cluster. Also, sites Tr 24, near Ixcaquixtla, and Ts 22, near Petlalcingo to the northwest of our valley, had a few Coatepec White and Quachilco Gray sherds mixed in with other types of Late Formative pottery, indicating the western boundary of the phase. A mound near Orizaba, Veracruz, also contained sherds and figurines of the early Remojadas type, indicating that the eastern boundary of the phase is about the Sierra Madre. To the south and southwest there was no boundary, and our Late Santa Maria sherds are closely linked to the Monte Alban I and II phases. In fact, the ceramics give good reason for considering the Late Santa Maria remains to be little more than a northward extension of these Oaxaca cultural complexes.

The Survey Sites

Tr 25. Tr 25 is located in the extreme northwestern portion of the Tehuacan Valley, some 30 km. northwest of Tehuacan and 7.5 km. south of Tlacotepec. The site is situated on the floor of the valley and has an area of about 100 by 40 m.

Tr 450. Located in the southeastern portion of the Tehuacan Valley, this site is situated on the floor of the Canyon Lencho Diego, some 3 km. northwest of the town, San José Tilapa, and 1.5 km. east-southeast of the village of San Rafael. The site, just north of Tr 67, consists of a single large mound-shaped structure, the northern portion of which has been destroyed by the Arroyo Lencho Diego. Horizontal bands of ash and burned clay are present in the exposed profile, as are two small (50 by 60 cm.) pits filled with rock and ash. These pits are located to either side of some form of construction, also present within the mound. It is not discernible, however, whether the stone walls of dry-laid cobbles and slightly modified limestone blocks represent reinforcing-retention elements used in the construction of a platform mound or whether they belong to a structure that has been covered by alluvium.

Tr 67. Tr 67 is located in the southeastern portion of the Tehuacan Valley, about 2.8 km. northwest of the town of San José Tilapa and 1.6 km. east-southeast of San Rafael, in the canyon of the Arroyo Lencho Diego. The site is situated on the floor of the canyon, partially overlaying a formation of silts and gravels believed to have been deposited in a large canal taking water from the Purron Dam (Tr 435) to the alluvial flats at the mouth of the canyon (Woodbury and Neely, Vol. 4).

Tr 452. This site was discovered in the southeastern portion of the Tehuacan Valley, some 2.2 km. north-

west of San José Tilapa and 2.4 km. east-southeast of San Rafael, in the canyon of the Arroyo Lencho Diego, above the dam and north of the causeway, Tr 15. It is situated on a small, low hill (about 25 by 70 m. and 2 m. high) composed of talus which is butted against the southeastern wall of the canyon.

Tr 366. It is located in the north-central portion of the Tehuacan Valley at the southern edge of the city of Tehuacan. The site is situated on the floor of the valley and the major portion of which was apparently modified by construction.

Ts 376. This site is located in the northwestern portion of the Zapotitlan Valley, about 1 km. southwest of the town of Zapotitlan Salinas (San Andrés) and 11.3 km. southeast of Santa Ana Teloxtoc. It is situated on the point of a high (20-meter) terrace overlooking the junction of the Canyon Rio Zapotitlan and the Arroyo Virgin.

Tc 260. This is a small cave located in Tecorral Canyon in the northwest portion of the Tehuacan Valley, about 5.5 km. south of Tehuacan and 4 km. west of San Marcos Necoxtla. It is situated about halfway up the cliff face, some 300 meters south of San Marcos Cave (Tc 254). It was tested by excavating a one-meter square to the depth of about ½ a meter, but large amounts of roof fall discouraged further digging.

Tr 235. Tr 235 is located in the northeastern portion of the Tehuacan Valley, approximately 1 km. north-northwest of the town of Nativitas and 6 kilometers northeast of San Marcos. The site is situated on a long, low hill some 50 m. in the grassy plain, east of the road from Santa Cruz to Nativitas.

Ts 212. Site Ts 212 is centrally located within the Tehuacan Valley about 500 m. south-southwest of San José Miahuatlan and 3.5 kilometers northeast of Teotitlan. Situated on the valley floor, it is slowly being eroded away by the intermittent washing of a small arroyo. The area encompassing this sherd area is difficult to estimate as the site is buried beneath the alluvium.

Tr 243A. Located centrally within the valley of Tehuacan, Tr 243A is situated on the valley floor some 2.7 km. southwest of Ajalpan and just east of the soccer field at the east edge of the town of Altepeixi. Much disturbed by looting and modern cultivation, the portion of the site still discernible has a total area of about 200 by 200 meters. The architecture consisted of 9 earth-core mounds faced with unmodified cobbles and boulders. Late Santa Maria sherds all came from the

TABLE 30
Late Santa Maria Seasonality Data

		Tc 272, H, 1-3	Tc 272, G, 1	Tc 272, G, 2	Tc 50, VII, A	Tc 50, VII, B	Tc 50 VII, C	Tc 260
MICRO-ENVIRONMENTS								
Travertine Slopes								
arroyo flanks								X
Alluvial Slopes					X	X	X	X
Canyons and Dissected Alluvial Slopes								
canyon flanks		X	X	X				
SEASONALITY								
Fall	CIRUELA FRUIT			X	X		X	
	AVOCADO FRUIT	X		X	X			
	CHUPANDILLA FRUIT	X		X	X		X	
Summer	Bean seed				X			
	SAPOTE FRUIT	X		X	X		X	
	Squash fruit and seed			X	X		X	
	Corn seed	X	X	X	X	X	X	
Spring	Pepper seed				X		X	
	LIZARD			X	X		X	
	milling stones	X	X	X	X	X	X	
	Amaranth seed						X	
	Mesquite seed				X	X		
	Grass seed		X	X	X	X	X	
	Setaria seed					X	X	
Winter Fall	Leucaena seed				X	X		
	Pochote seed				X		X	
	TETECHU FRUIT					X		
	COYOL FRUIT		X	X	X		X	
	COSAUICO FRUIT	X		X	X	X		
COMPONENT DIMENSIONS								
length in meters		20	7	9	7	9	14	10
width in meters		5	5	5	5	6	5	2
extent in sq. meters		100	35	45	46	54	70	20
SETTLEMENT FEATURES								
cache pit					1			
fire pit		2	1	1	1		2	
storage pit					2	1	1	
roasting pit		1	1	1				
fired area						1		
SETTLEMENT PATTERN TYPES								
Microband indeterminate (dry?)								X
Microband multi-season cave camps								
spring-summer-fall camp							X	
winter-spring camp						X		
summer-fall camp		X		X	X			
Microband single season cave camps								
spring cave camp			X					

more southerly plaza encompassed by four of the mounds.

Tr 355. This site was found in the northwest part of the Tehuacan Valley about 4.2 km. west-southwest of Tehuacan and 4.7 km. west-northwest of the village of Coapan. It is situated on a 10 by 30 m. terrace on the north flank and about halfway up the large terrace projecting from the northeast face of the Cerro Tecuan-tepetl. The site is bisected by the dirt road ascending the terrace, to a large quarry above it.

Tc 272, a stratified cave, is described in Chapter 3.

Tr 368, *Ts 204*, and *Tr 218*, stratified sites, are described in Chapter 5.

Tc 50, a stratified cave, is described in Chapter 6.

Tr 435 and *Tr 15* are described in Volume 4 of this series.

Indeterminate Occupations

Tr 349 (Abejas Phase) is described above.

Tr 278, *Tr 369*, *Tr 449*, and *Tr 363* (Early Santa Maria Phase) are described above.

Tr 146, *Tr 356*, *Tr 304*, *Tr 251*, *Tr 77*, *Tr 131*, *Tr 73*, and *Tr 41* (Early Palo Blanco Phase) are described below.

Tr 299 and *Tr 145* (Late Palo Blanco Phase) are described below.

Tr 82, *Tr 140*, and *Tr 44* (Early Venta Salada Phase) are described below.

Tr 80 and *Tr 165* (Late Venta Salada Phase) are described below.

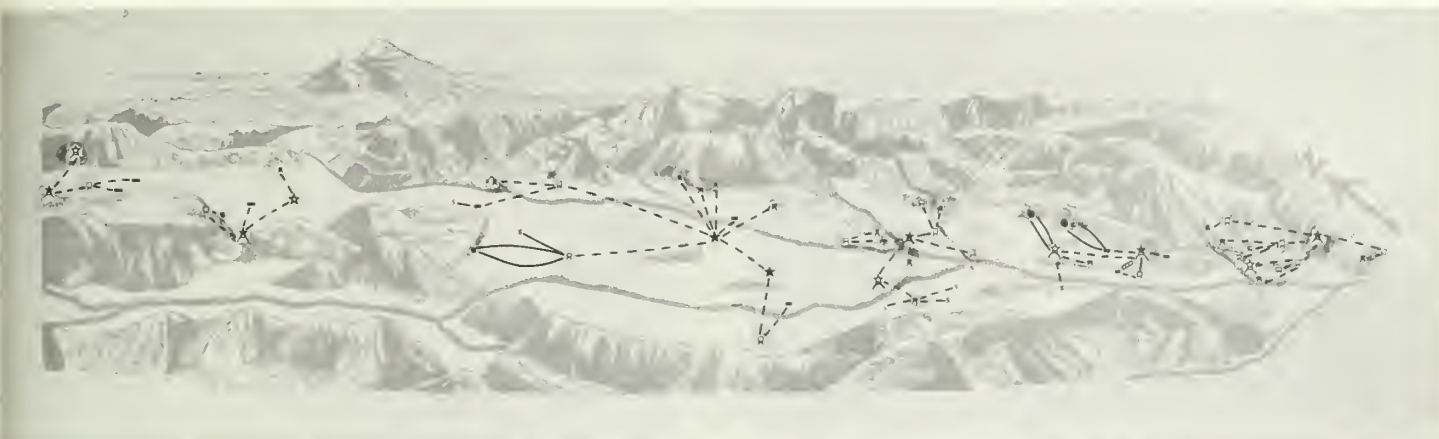


Fig. 162. The reconstructed Early Palo Blanco settlement pattern in the Tehuacan Valley.

The Early Palo Blanco Settlement Pattern

In Early Palo Blanco times, 150 B.C. to 300 A.D., we can see a dramatic change in the settlement pattern in the Tehuacan Valley. There is a significant increase in the number of sites (38 to 127) and components (135 components from 127 sites). Some of the sites are much larger in size and the predominant number are located on hilltops. More micro-environments are being exploited. We now see the newer boulder or cut-block architecture, a type entirely different from that of the previous phase.

Perhaps the most striking new aspect of this sub-phase is the presence of fourteen towns covering about 4,840,000 square meters, a nine-fold increase over the area encompassing all the earlier Santa Maria sites. These towns occur in almost all the major micro-environments, six in the eastern Alluvial Slopes, six in the Valley Center, one in the southwest Dissected Canyons, and one on the edge of the western Travertine Slopes just above the El Riego Oasis. This expansion of Early Palo Blanco sites into more of the micro-environments is impressive. However, a factor we consider more distinctive is the topographical location of the sites. Eleven of the fourteen towns are located on the level tops of prominent hills, a particular location rarely, if ever, used in the previous phases. The remaining three Palo Blanco towns located in the valley bottoms, like the single one of Late Santa Maria, are somewhat atypical Early Palo Blanco sites. Tr 218 and Tr 243 were occupied in Late Santa Maria times and lack the typical Early Palo Blanco settlement features such as I-shaped ball courts, building materials of stone block, terraces, and often the occurrence of plazas sur-

rounded by pyramids on either two or three, but never four, sides. The other valley site, Tr 19 near Tecomavaca, located on a river terrace, includes Early Palo Blanco settlement features such as an I-shaped ball court, terraces, and block building construction. However, it is just below the huge Late Palo Blanco hilltop site, Tr 298, and could be merely a westward extension of an even larger Early Palo Blanco occupation covering the hill, extending down onto the terrace, and only recognized at Tr 19. Thus the Palo Blanco towns have been divided into two major groups, valley and hilltop, the latter being the more typical of Early Palo Blanco.

Another feature of the Early Palo Blanco towns concerns the kind of structures and arrangement of these structures within the town sites. These features allow one to further subdivide the hilltop and valley towns into what we have termed "nuclear" and "diffuse." Six of the eleven hilltop sites, and the poorly understood Tr 19 that could be either hill or valley, have a number of features in common. All have a number of plazas and an I-shaped ball court nested around or adjacent to a large plaza with pyramids constructed of blocks in the "talud-tablero" manner. These plazas are usually terraced, as are the sides of the hills, and construction on them becomes smaller and less impressive as one radiates out from the centers; only single-room houses with block or boulder foundations are found at peripheries. All of these towns (Sites Tr 251, Tr 41, Tr 186, Tr 73, Tr 144, Tr 301, and Tr 19 are described below), as well as the other two in the valley, Tr 243 and Tr 218, have a true nucleus. The largest structures,

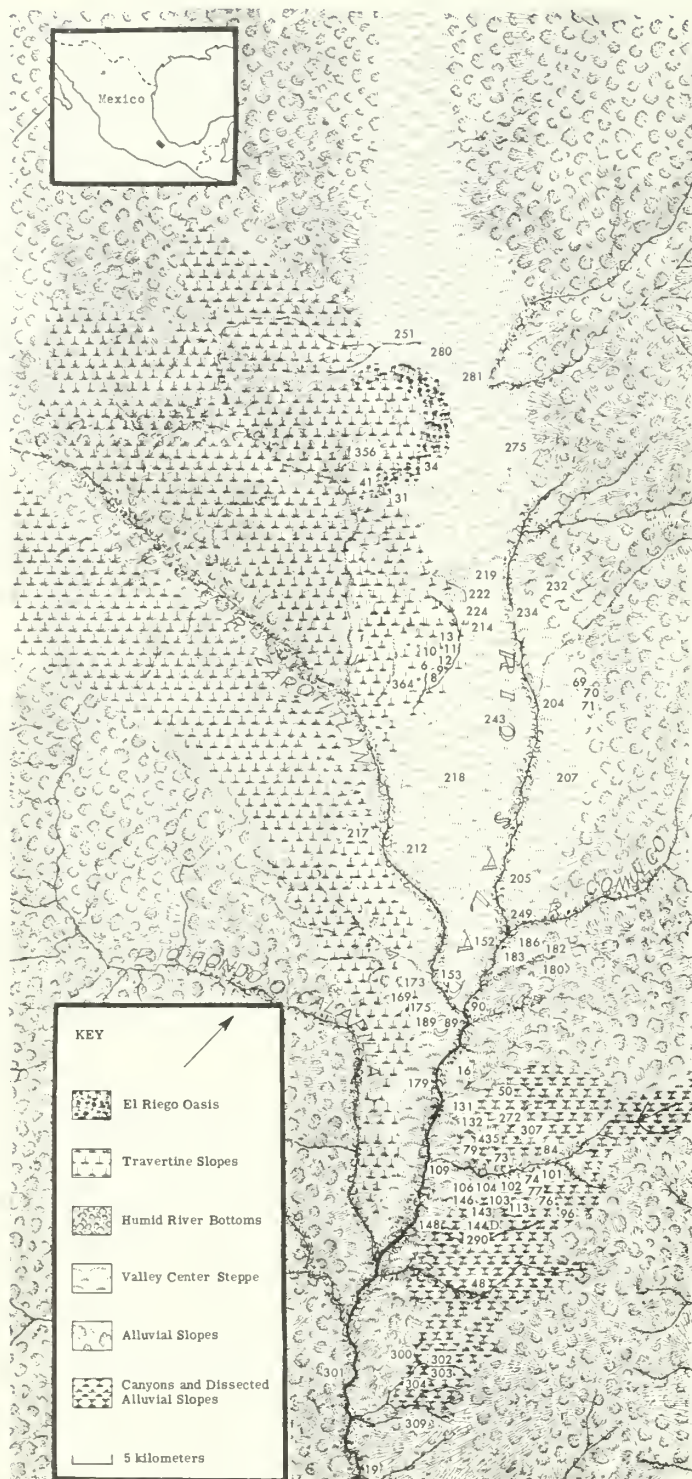


Fig. 163. An ecozone map of numbered Early Palo Blanco sites in the Tehuacan Valley.

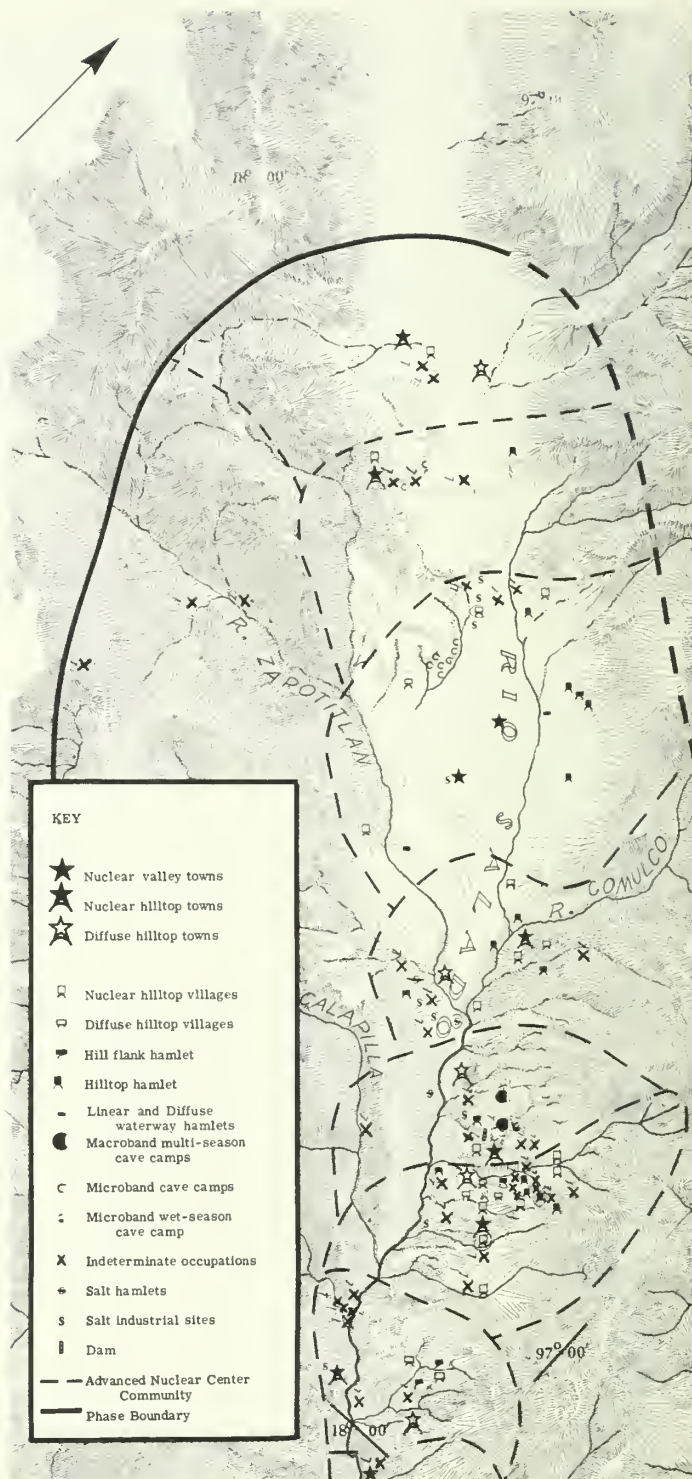


Fig. 164. Map of Early Palo Blanco settlement pattern types in the Tehuacan Valley.

which are also the most specialized, the most ceremonial (and the least livable), are located in and around the central plazas, which are often on the highest spots on the hill (the three valley towns excepted). We have applied the terms "nucleated" or "nuclear" to them because their relatively rigid hierarchically-oriented and ceremonial patterns have obvious implications concerning the social structure and systems of ideologies of the people who built and lived in these settlements.

The other five hilltop towns lack the central plaza area with clustering sub-plazas and are all rather different from each other in the types of features found on them. However, all include the same kind of block "talud-tablero" architecture. They do not have all the diagnostic features of the nine nuclear towns discussed above. Tr 309 has two plazas on either end of a long hill, one surrounded by mounds on three sides and the other with mounds on opposite sides. An I-shaped ball court is on the flanks of the hill, but no side-hill terracing for houses existed, nor was there a central closed nucleated plaza area. Tr 106 is situated atop five hills. There are U-shaped plazas on two of them and house features on the others, but no ball court anywhere. Tr 16 lacks an I-shaped ball court and central nucleated plaza area but does have side-hill terracing with house structures on it. Three widely separated mound groups indicate simply single mounds on opposite sides of plazas, or, possibly, in the case of two low elongated mounds, an enclosed, narrow ball court. Tr 281 was a large L-shaped hill with three widely separated mound groups on both ends of the hill as well as at the junction of the two arms. The southern extension of the hill had pyramids on opposite sides of plazas. The central and north mound groups had pyramids on all sides of the plazas and the latter had an associated I-shaped ball court. The side of the hill was not terraced for single-room structures. Town Tr 153 was badly destroyed but seems to have no side-hill terracing or ball courts, but three widely separated plaza areas perhaps surrounded by structures on all sides. The lack of a nucleated plaza and the wide variation in terracing, ball courts, or even the lack thereof, and the arrangement of mounds around plazas has led us to classify these towns as being diffuse. Thus, we have located on our map three types of towns, nuclear valley towns (3), nuclear hilltop towns (6 or 7, Tr 19 being a possible seventh), and diffuse hilltop towns (5) with the latter possibly having some sort of social system rather different from that of the others.

The 23 village sites of Early Palo Blanco are also

rather different from the ten village components of Late Santa Maria. Although Early Palo Blanco villages occupy only three times as large an area as that of Late Santa Maria, and there were 23 instead of ten components, all the Early Palo Blanco villages were very different in terms of architectural style (21 "talud-tablero" of cut blocks). Furthermore, 22 were on hilltops and only one in the valley bottom topographic locality occupied by Santa Maria sites. Like the Late Santa Maria villages the majority (12) had a single nuclear mound. Three of the plazas were U-shaped, eight had mounds on all sides, and a single plaza had mounds on opposite sides. Thirteen of the hilltop sites had single-room house structures surrounding them, allowing them to be classified as nuclear hilltop villages, but unlike those of Santa Maria, they were not the only and primary centers of communities, but surrounded Early Palo Blanco towns, and thus were probably secondary centers. Rarely in Santa Maria were house structures not found clustered around mounds or plaza areas. In Early Palo Blanco, however, at five sites, house structures were strung out randomly along hilltops; in three, they were aligned in a linear manner, and in one village site on a hill flank, the house structures were arranged in a random manner. These were all classified as diffuse hilltop villages.

Hamlets of Palo Blanco are also different in that eight are concentrically arranged on hilltops while six are strung out (diffuse), two are linearly arranged over hilltops and two are on hill flanks—concentric and diffuse hilltop hamlets and linear hilltop and hill flank hamlets—while two are the older type, linear waterway hamlets. Two hamlets were associated with salt industrial features. Also occurring were two macrobands and 18 microband camps.

Besides these definite Early Palo Blanco occupations, there were 40 other sites with a few sherds of Early Palo Blanco, but many sherds of earlier or later occupations. Ignoring for the moment the area covered by these indeterminate occupations, we still have, with definite occupations covering 6,758,900 square meters, a thirteen-fold increase over the area covered by Late Santa Maria sites. This certainly reflects a large increase in population over the previous phase and if our estimates for Santa Maria are anywhere near correct, then a guess of from 20,000 to 30,000 population for Early Palo Blanco does not seem unreasonable.

Ten sites had large amorphous salt mounds. Four of these had rectangular bins (1 by 2 meters) while three of these had single larger mounds with vents, pipes, or stone cores on their tops, suggesting the

cooking-off of salt. Also, two sites had boulder rectangular house foundations with salt mounds and one of these, Tr 179, had salt bins, and 2 canals with dams leading from salt seeps to the bins. All salt sites were in the Valley Steppe or eastern Alluvial Slopes micro-environments.

Two sites, Tr 90 and Tr 41, had small areas in them where large blocks had been cut and quarried from the bedded rock stratum below them. The construction materials in the many ruins indicate there must be many other quarries and this was an important industry.

Tr 435, the Purron Dam, fourth stage of construction, was still in use in Early Palo Blanco times. Other than that, irrigation features were not numerous. Tr 96, Tr 113, and Tr 275 had side-hill terracing, presumably for agriculture, for there were no house platforms on the terraces. Side-hill terracing with house platforms, however, occurred at many (27) other sites. On these latter sites, these terraces, besides forming areas for living, could also have been used for limited agriculture. In the flat plains, the distribution of sites suggests the use of canals.

In other sites architectural features of a nonhabitational nature concerned burials. At Tr 218, intrusive into Tr 368, and in Tc 50 were extended burials in elongated pits which were usually faced on one side by vertically set rectangular slabs; and these had a few simple burial goods with them. Further in caves Tc 31 and Tc 34 at El Riego we found the remains of looted niche burials and according to local reports, jade beads, textile, and pottery were associated with them. Related to these are smaller rectangular tombs with slab masonry walls with multiple extended burials in them, associated with pottery. The final type of burial feature was the tombs that occurred at Tr 301. One of the examples (completely looted) showed it to have been roughly cruciform in shape with steps leading into a central wide alley (12 meters long, 1 meter wide) and three rooms (4 meters long by 1 meter wide) on opposite sides of the alley for burials. The tomb had been dug into the ground to a depth of about 2 meters and the walls and floor were constructed of thin slabs of cut stone lying horizontally; the sides of the tomb entryways were carved out of blocks of stone. Both parts had been covered with mud and stucco that was painted red. The roofing of the tomb rooms was of large sandstone slabs about 1.80 meters long, about .40 cm. wide, and about 25 cm. thick, laid across the rooms and central hall. Needless to say, there were numerous stories about the "tesoro" from these tombs.

These three kinds of burials suggest some sort of status system within Early Palo Blanco society, and one is tempted to correlate these burial features with various types of architectural features in the ruins themselves, which also seem to reflect varying social statuses and roles. At the lowest level, that is, the 20 microband and macroband camps, we see various occupational features such as roasting pits (7), cache pits (5), storage pits (1), and fired areas (3). Also, at this status level, or slightly higher, are the rectangular single-room house foundations. These varied slightly in size from about 1.5 to 4 meters wide to 3 by 6 meters long, and were for the most part made of two kinds of materials, either boulder from 20 to 40 cm. in diameter or cut blocks of about the same size. These minor variations, however, do not seem to have any spatial, temporal, or cultural significance but rather reflect the kinds of raw materials at hand. The majority of the house foundations were 2 by 4 meters in size (772 of boulder and 578 of cut blocks), while those 3 by 5 meters had 195 of boulder and 169 of cut block. 24 and 13 house foundations of boulder and of block, respectively, were of the longer size, 4 by 6 meters. It might be added that house platforms of a 2 by 4 meter size are mentioned for two sites: Tr 234 "a few stone slabs of house foundations" and Tr 205 "circa 40 house foundations of slabs." Whether this is a continuation of the Santa Maria house-building technique, a reflection of the kind of raw rock materials available near these sites, or just bad note-taking during the survey cannot be determined (although we suspect it is the latter.) There is no evidence of the boulders or blocks representing a true wall on any of the 1800 foundations recorded and, with the exception of some at Tr 301, there is no mention of plaster on them or their adjacent floors. There were many cases of them being associated with wattle-and-daub, however. Therefore, we suspect that these stone house outlines were in fact house foundations buttressing the inner and/or outer wall of wattle-and-daub walled houses with thatch roofs. Actual reconstruction of this house type must await excavation.

A higher level of structures are composed of two general groups. The first and better defined of this class would be the smaller (less than 10 by 20 by 3 meters high) truncated pyramids with steeply-sloping walls of cut stone blocks, usually with a short flight of steps inset in one of the longer sloping sides. About 20 of 1010 samples of these had foundations of houses on them so we have usually referred to them as house mounds. The other group is more difficult to define but all are large foundations (larger than 4 by 6 meters).

Six of these structures (about 10 to 12 by 3) are block foundations that outline two contiguous rooms (3 by 17 meters), one at Tr 73 has three contiguous rooms, one (5 by 25 meters) at Tr 106 has five rooms, and one (15 by 4) at Tr 146 had seven contiguous rooms of double walls. Thus, there were 27 rooms in 9 different structures. The others are on odd lots with the one at Tr 146 being of double walls and 4 by 6 meters in size, while there were 4 at Tr 103 with roughly square rooms (4 by 4 to 6 by 8) with a smaller room (2 by 2) in one corner of the large room, and one at Tr 106 had eight small rooms (3 by 5) surrounding a patio. Thus, there were also 6 structures with 17 rooms. All of these have been referred to as multi-room house foundations.

The other architectural features are much larger and would have required a much greater expenditure of energy to build. Their function was probably not mainly residential. These would be of a highest status level somewhat like the tombs. The most prominent of these would be the larger (over 20 meters long, 10 meters wide, and 2 meters high) truncated pyramids. The majority of these (56) are of the "talud-tablero" style of building with steeply-sloping walls of cut blocks leading to a vertical wall of cut-stone blocks and with an inset staircase, or staircases, leading to their flattened summits. Two other pyramids were, however, of the stepped variety. In a few cases, these were associated with rectangular or U-shaped causeways. Also of this general class or level would be the 9 I-shaped ball courts, the one rectangular ball court, and the two or three parallel-mound courts.

Obviously, the various types of structures and their relationship to each other and to the various features of the micro-environment were basic to our classification of settlement types. The arrangement or clustering of the various settlement types within the Tehuacan Valley was a basic factor in our determination of the extent of the larger communities and the community types. The number of clusters (7 or 8) is not very much greater than the 5 or 6 clusters of Late Santa Maria, but, of course, most of the Early Palo Blanco clusters have many more sites within them. The northernmost small cluster is composed of a huge nuclear hilltop town (Tr 251), a large diffuse hilltop town (Tr 281), and a nuclear hilltop village (Tr 280) and two indeterminate salt sites, Tr 270 and Tr 279. Near the city of Tehuacan a cluster is composed of a nuclear hilltop town (Tr 41), a possible continuation of Tr 366 into a diffuse valley town (here classed as an indeterminate occupation), a nuclear hilltop village (Tr 356), and a nuclear hilltop hamlet (Tr 275). Cave

sites Tc 34 and Tc 31 are located in the El Riego Oasis area. Tr 33 and Tr 355 both had indeterminate occupations. Three other sites in the western Travertine Slopes, Tc 350, Tc 346, and Tc 333, were also classified as indeterminate. These, however, may have belonged to another community west of our area.

Moving southward, another cluster occupies a somewhat larger area in the north-central part of the valley. Here, two nuclear valley towns, Tr 218 and Tr 243, were first occupied in the previous period. They are surrounded by Tr 217 and Tr 232, nuclear hilltop villages, and diffuse hilltop villages Tr 364 and Tr 224. Hamlets on hilltops include Tr 234, Tr 207, Tr 71, and Tr 69, with more or less concentric clusters of houses, while those on the hill at Tr 70 are strung out. Ts 204 and Tr 212 seemed to have been linear hamlets along waterways. Seven microband cave occupations (Tc 6, Tc 8, Tc 9, Tc 10, Tc 11, Tc 12, and Tc 13) found on the western Travertine Slopes, and three salt sites, Tr 219, Tr 222, Tr 214, complete the cluster, with the exception of three sites classified as indeterminate in occupation (Tr 43, Tr 227, and Tr 223).

A cluster in the center of the valley includes Tr 186 on a hilltop as its central nuclear town and Tr 153, a diffuse hilltop town. Tr 90 and Tr 183 are nuclear hilltop villages, while Tr 205 and Tr 182 are diffuse hilltop villages. Hamlets on hilltops with concentric arrangements would be Tr 249 and Tr 152, while Tr 169 and Tr 180 were hamlets with houses scattered over hilltops. Tr 89, Tr 189, and Tr 175 are salt industrial sites; Tr 173 is a salt hamlet. Tr 174, Tr 176, Tr 171, and Tr 184 have some Early Palo Blanco sherds in them and their settlement pattern could not be determined.

A community which seems to be a continuation of the previous one has occupations clustering around Purron Dam (Tr 435) in the Dissected Canyon area of the valley. Tr 73 is its nuclear hilltop town, Tr 16, a diffuse hilltop town, Tr 79 is a nuclear hilltop village and Tr 132 a linear hilltop hamlet, and Tr 131 a salt industrial site and Tr 179 a salt hamlet. Zone VI of Coxcatlan Cave (Tc 50) and Zones E and F of Purron Cave (Tc 272) were agricultural camps at this period, and Tc 307 showed evidence of a microband occupation. Sites Tr 67, Tr 75, Tr 78, and Tr 139, as well as the cave, Tc 200, had some sort of an Early Palo Blanco occupation.

Located on many of the hills south of the Tilapa River and in northernmost Oaxaca was another large cluster of sites. Tr 144 seems to be the capital, a nuclear hilltop town with Tr 106, a diffuse hilltop town, located on five nearby hills as its secondary center.

Nuclear hilltop villages abound, with Tr 48, Tr 290, Tr 143, Tr 113, Tr 101, and Tr 84, but a few diffuse hilltop villages occur, Tr 146, Tr 103, and Tr 104. Hilltop hamlets, also, surround them; four are arranged concentrically, Tr 74, Tr 76, Tr 77, and Tr 96, while more irregular in their layout are Tr 109 and Tr 102. Tr 148 is a salt industrial site. There, also, are a large number of other sites which contained Early Palo Blanco sherds: Tr 99, Tr 100, Tr 82, Tr 94, Tr 95, Tr 287, Tr 283, Tr 87, Tr 108, Tr 97, Tr 98, and Tr 145.

Further south in the valley all sites are on hills in a cluster around the present town of Los Cues. Tr 301 overlooking the Rio Salado is the nuclear hilltop town; Tr 309, the diffuse hilltop town, Tr 303 and Tr 300, diffuse hilltop villages, and Tr 302 and Tr 304 diffuse hilltop hamlets. Many other sites, mainly on nearby hills, Tr 305, Tr 306, Tr 413, Tr 416, Tr 417, Tr 420, and Tr 422, also had Early Palo Blanco sherds on them and their initial occupation probably began in this period.

A final large site, Tr 19, at the southern tip of our area of exploration, was also a large town, but our survey of it, and the surrounding region, was most inadequate. It probably is the capital or major component in still another community. Close to it is an indeterminate occupation at Tr 298.

As is perhaps obvious, there is a definite hierarchical pattern in these communities, large or small. Each community has a nuclear town, and (except for the valley towns Tr 218 and Tr 243, both first occupied in the previous period) all are located on prominent, large, leveled hills. These towns are all very similar and have definite patterns of nucleation. Series of nested plazas are surrounded either by a few ceremonial structures (pyramids and I-shaped ball courts) which in turn are surrounded by small house mounds, or by structures with large house foundations, surrounded by many small rectangular single-room, rock-outlined house structures.

A high degree of nucleation can also be seen in the arrangement of settlement types. In five of our seven communities these nuclear centers are accompanied by large hilltop towns, wherein the plazas are arranged rather differently. Not all the ceremonial structures are nucleated, nor are they necessarily surrounded by lesser structures. Furthermore, the settlement pattern within each of these diffuse towns is slightly different, one from the other. Oriented to these larger ceremonial centers are lesser administrative or ceremonial village centers (usually also on hilltops). The number varies from one community to the next and seems more or less proportional to the number of hamlets that are

oriented to them. One community in the northern part of the valley has one village and one hamlet, as does another in the Dissected Canyons area around the Purrón Dam. The southernmost community has two villages and two hamlets. A large central community has four villages and five hamlets; another, four villages and four hamlets. What appears to be the most populous community has nine villages and five hamlets, and twelve indeterminate sites. Because of this obvious high degree of nucleation of settlement types on the ground, we have referred to these communities as being *Advanced Nuclear*, or *Nucleated Center Communities*.

On a more impressionistic level, one cannot help but wonder if the relatively rigid and uniform hierarchical system of settlements within these communities, the graded hierarchy of types of structures with ceremonial structures being the apex of hierarchy within their villages and towns, and the ranked burial types, do not reflect analogous features in the social and cultural system of the peoples of Early Palo Blanco times. Do these settlement, architectural, and burial features indicate that the emphasis of this society was on ceremonial phenomena, and that there was some sort of division of labor between the ceremonial elite in the centers and their assistants, and the peasants in the hamlets and the occupants of the stone foundation houses at the peripheries of the villages and towns?

When these sites are plotted on a map, they very neatly delimit the boundaries of the Early Palo Blanco Phase occupation within the region. The northernmost sites are just south of Tepanco, and it should be noted that the Classic Period remains at Tlacultepec and at Tecamachalco (Tr 360) are entirely different, being like those of Cholula II. To the west, no Early Palo Blanco Phase sites were found in the Zapotitlan Valley. Sites Tr 349 through 351, located near Acatepec, contain great amounts of early Thin Orange pottery which indicates a contemporary ceramic complex very different from that of the Early Palo Blanco Phase. To the east, we did little survey in the Sierra Madre Oriental, but, even so, found no Early Palo Blanco Phase sites in the areas we did cover. Classic sites just east of the high Sierras, such as at Rio Blanco, Veracruz, contain Las Remojadas-like materials, and Valle Nacional sites, to the southeast in Veracruz, contain still another entirely different ceramic complex. Thus, the mountains to the east of the Tehuacan Valley seem to have been a cultural boundary during this subphase. Early Palo Blanco Phase remains are more numerous as one proceeds southward in the Tehuacan Valley, and the southernmost site recorded by this survey, Tr 19, is near the town of Tecomavaca—outside the valley

proper and in the state of Oaxaca. However, we do not consider this as a southern boundary, for early Classic ceramics from the Cuicatlan area and even the northern end of the Valley of Oaxaca are difficult to distinguish from Early Palo Blanco Phase types. In fact, during Early Palo Blanco Phase times, the Tehuacan Valley could be viewed as a narrow, northward extension of the Classic Monte Alban II-III culture of Oaxaca.

The Survey Sites

Habitational Sites

Tr 218. Zone A of this nuclear valley town is described in Chapter 5.

Tr 74. This hilltop hamlet represented by house platforms is located in the southeastern portion of the Tehuacan Valley, on the first small hill at the east-northeastern edge of the town of San José Tilapa.

Tr 243. This nuclear valley town is described above.

Tr 19. This huge nuclear town, known locally as "Tecomavaca Viejo," is located south of the Tehuacan Valley, just 500 meters north-northwest of Santa Maria Tecomavaca, Oaxaca. Situated on a river terrace, the site has an area of approximately one by two kilometers.

Tr 48. A rather large nuclear hilltop village, this site is located in the extreme southeast portion of the Tehuacan Valley, about 1.5 km. southwest of San Martin Toxpala and 1.5 km. northeast of Ingenio de Ayotla. The majority of the structures appear to have been constructed in a generally straight line running northwest-southeast; the few remaining structures are clustered to the northeast opposing the approximate center of the line of structures. Between these two basic groupings of structures is what appears to be a rectangular plaza or ball court, its general northwest-southeast orientation perhaps indicating the latter of the two alternatives to be the more likely.

Tr 102. This diffuse hamlet is located in the southeast portion of the Tehuacan Valley, situated on a low, roughly rectangular hill about 400 m. south-southwest of San José Tilapa and 4.7 km. northwest of Teotitlan del Camino. This southwest-northeast oriented hill evidently had been artificially leveled by terracing, and a low wall of boulders originally outlining the summit still are visible, as are house foundations.

Tr 16. This huge dispersed town was found in the

southeast quarter of the valley approximately 500 meters east of the village of Pueblo Nuevo and 3 km. north-northwest of San Rafael. The site is situated on a large hill which has an area of about 500 by 1500 meters. The major concentrations of architecture are located on three small rises jutting up from the top of the hill. No real orientation is noted for this architecture as it seems to have been built to follow the general shape of the area available. Atop of each of these three rises was found basically the same pattern of structures: two large, long and narrow platform mounds, made of earth and rubble with well-shaped slabs and blocks used for facing stones, constructed parallel to one another with an area of about 30 meters wide separating them. Although no evidence was discovered to corroborate this idea, it is quite possible that the area between the two mounds was used as a plaza that was open at two ends. In association with the northernmost grouping of mounds and plaza-like area were found 5 or 6 rectangular house foundations constructed of slightly modified stone slabs and blocks. A ball court was constructed in the dip or saddle-shaped depression between the northernmost and central rises and their groupings of structures. This ball court is indicated by two long east-west oriented narrow mounds with a depression between them. In addition to these structures, a series of small square and rectangular house foundations were found on the terraced upper flanks of the west side of the large hill.

Tr 77. This hamlet is located in the southeast part of the Valley of Tehuacan, about 1.5 km. east-southeast of San José Tilapa and 3.5 km. north-northwest of Teotitlan del Camino. Situated on the summit and flanks of a large hill, the majority of its rectangular block house foundations were on the artificially flattened southeast portion of the summit and on the few small terraces constructed on the northeast flank of the hill.

Tr 152. This hamlet was discovered in the central portion of the Valley of Tehuacan, about 5.5 km. west-northwest of the town of Coxcatlan and 4 km. southwest of Calipan. The hamlet of rectangular cut block house foundations is situated on the flanks and atop the southwest peak of a small, round, twin-peaked hill along the west bank of the Rio Salado.

Tr 232. This nuclear hilltop village site was discovered in the northeast quadrant of the Tehuacan Valley, about 3 km. east-northeast of San Diego Chalma and 4 km. northwest of Nativitas atop and along the south flank of a small hill.

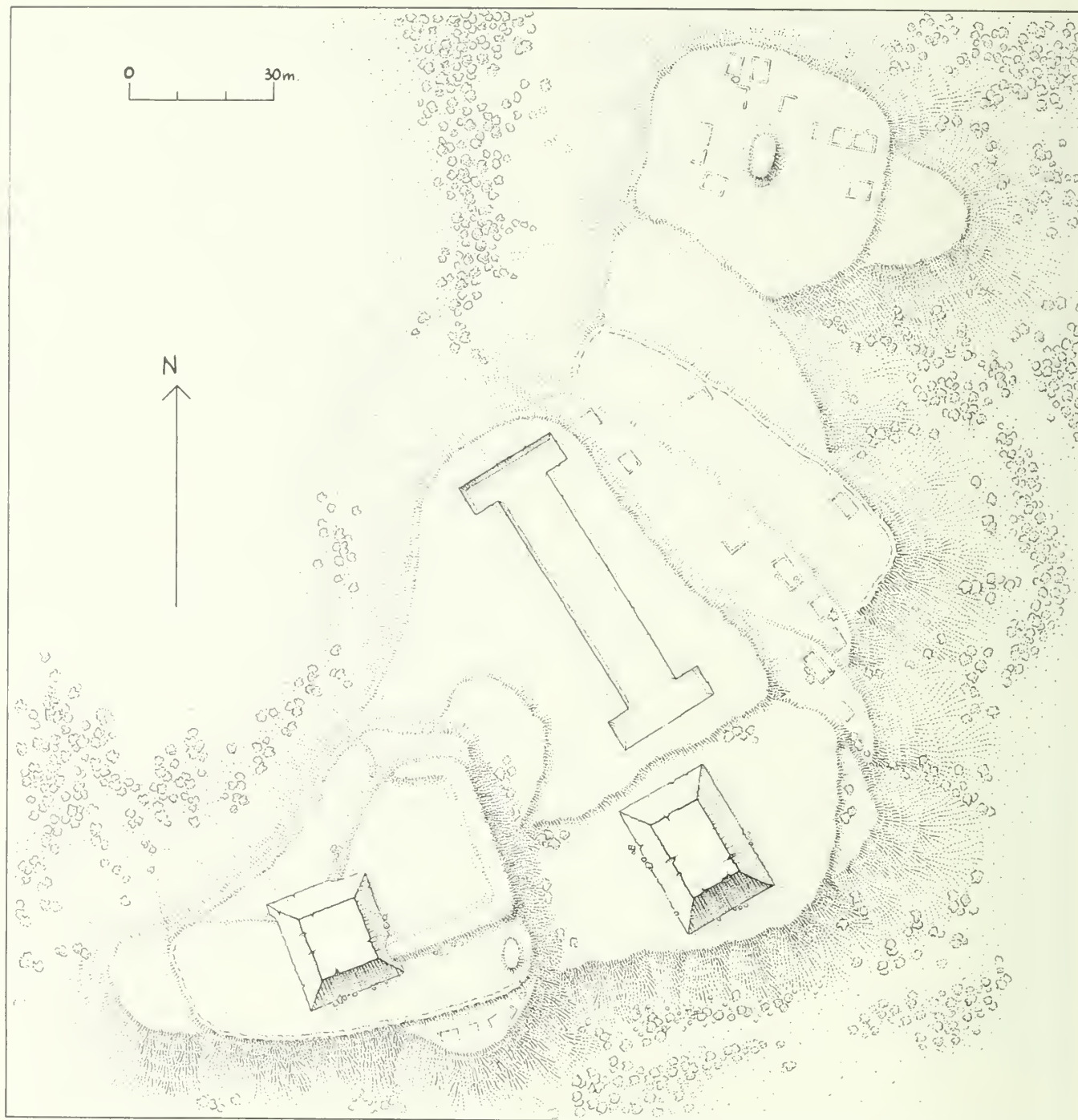


Fig. 165. A reconstruction of Site Tr 73, an Early Palo Blanco dispersed hilltop town, based upon survey sketch map.

Tr 207. Tr 207 is located in the east-central portion of the Tehuacan Valley, about 5.3 km. southeast of Ajalpan and 1.4 km. east-northeast of San Sebastian Zinacatepec. The hamlet was concentrated on three terraces built on the low, northwest spur of a high,

roughly conically-shaped hill. For the most part, the terraces and the 50 or so house foundations thereon have been greatly disturbed and the construction materials removed for reuse. It is quite possible that the summit of the high hill and a cave located in its west

Table 31 continued on reverse side

Table 31 (continued)

flank were also used by the prehistoric inhabitants of the area. All evidence of such occupation has been destroyed or is no longer readily visible, however, as the El Calvario de San Sebastian shrine occupies the summit of the hill and the cave is now used for storage and as a stable.

Tr 71. Located in the northeast section of the Tehuacan Valley, this small hamlet was found about 200 m. southeast of *Tr 70*, 1 km. northeast of Ajalpan and 5.4 km. southeast of Nativitas. Situated on a hill flank, but extending to its top, the site consists of about 8 to 10 low house foundations of crudely-shaped stone blocks.

Ts 212. This linear waterway hamlet is described above.

Tr 73. This nuclear town is located in the southeast quarter of the Tehuacan Valley, approximately 2.6 km. west of San José Tilapa and 2.5 km. southeast of San Rafael. The site, known locally as the "Cerro del Tunel," is situated on the summit and flanks of a large hill, and has an area of about 1 by 1.5 kilometers. The summit and higher portions of the north and south flanks were artificially terraced to form flat areas for plazas and for the construction of house foundations and platform mounds faced with dry-laid slab masonry. These flat, shelf-like areas were, for the most part, constructed by leveling the existing natural terraces. The retaining or terracing walls of dry-laid gypsum and limestone slabs and blocks, some of which had been slightly modified and shaped, are still readily visible along the outer edges of the terraces. Four large terraced-plaza areas were identified during the survey; these are located roughly on a straight line northeast to southwest, following the long axis of the hill. The northeasternmost terrace has one large mound on the east side of a plaza with 5 smaller house platforms or mounds around the other three sides. Directly south, one meter, are three plaza-like areas with one or two small mounds on them and a house platform, while the third terraced area just east of this one has a series of house platforms on its three plaza areas. To the south and two meters higher is the fourth terrace on which a large I-shaped ball court was constructed. A large mound is just east of it. The southern flank of the hill, the summit, is about six meters above the fourth terrace. Here a huge mound in its south end is connected by three long mounds, or causeways, to form an enclosed plaza. A number of other mounds and plazas surround this town center.

Tr 79. This village site is located in the southeast portion of the Tehuacan Valley, about 2.7 km. west-north-

west of San José Tilapa and 2 km. southeast of San Rafael. *Tr 79* is situated on a small, long hill and seems like a satellite village to *Tr 73*, 300 meters to the north-west. On its north side, a single plaza is composed of a long mound on the north and to the south, a U-shaped mound or causeway facing it. An I-shaped ball court nests against the south end of the plaza. Ten to twenty house platforms are on the south end of the hill and all sides of the hill are terraced.

Tr 41. This large nuclear hilltop town is located in the northwest section of the Tehuacan Valley, 4.7 km. west-northwest of the village of Coapan and 5.9 km. southwest of Tehuacan. Situated on several of the high, natural terraces on the northeast flank of Cerro Tecoahtepetl, *Tr 41* has an estimated maximum area of 500 by 800 meters. The predominant architectural features were constructed on the summit of an east-west oriented, projecting terrace or spur of the Cerro Tecoahtepetl. This summit, its U-shaped opening to the north, is known as "Zacualontzin," and is located just above the modern quarry, "El Yeso." A large I-shaped ball court joins the east and west arms of the U-shaped complex of construction on the summit. The west arm is formed by a large, rectangular platform mound with two smaller platforms adjoining its north and south faces. The ball court abuts its east face. The east arm of the U-shaped complex is composed of two plazas with adjoining platform mounds. The larger plaza is located a few centimeters east of the ball court and is bordered on the east by the long axis of a stepped or truncated platform mound. The other plaza abuts the base of the stepped platform mound along its north face and is slightly overlapped by the northeast corner of the larger plaza. A platform mound borders its east face. Both plazas are outlined to the north and west by low, wall-like mounds of stone.

Smaller architecture of small mounds and stone block house foundations of varying size are located on the natural terraces extending to the north and south of this spur at slightly lower elevations. Concentrated primarily to the north of the spur, these small clusters of architecture occur intermittently for a distance of some 1.5 km., at which point the Cerro Tecoahtepetl takes a more westerly course.

Tr 70. This small hamlet is located in the northeast portion of the Valley of Tehuacan, 1.0 kilometer northeast of Ajalpan and 5.2 km. southeast of Nativitas atop a long, low hill.

Tr 186. East-centrally located in the Tehuacan Valley,

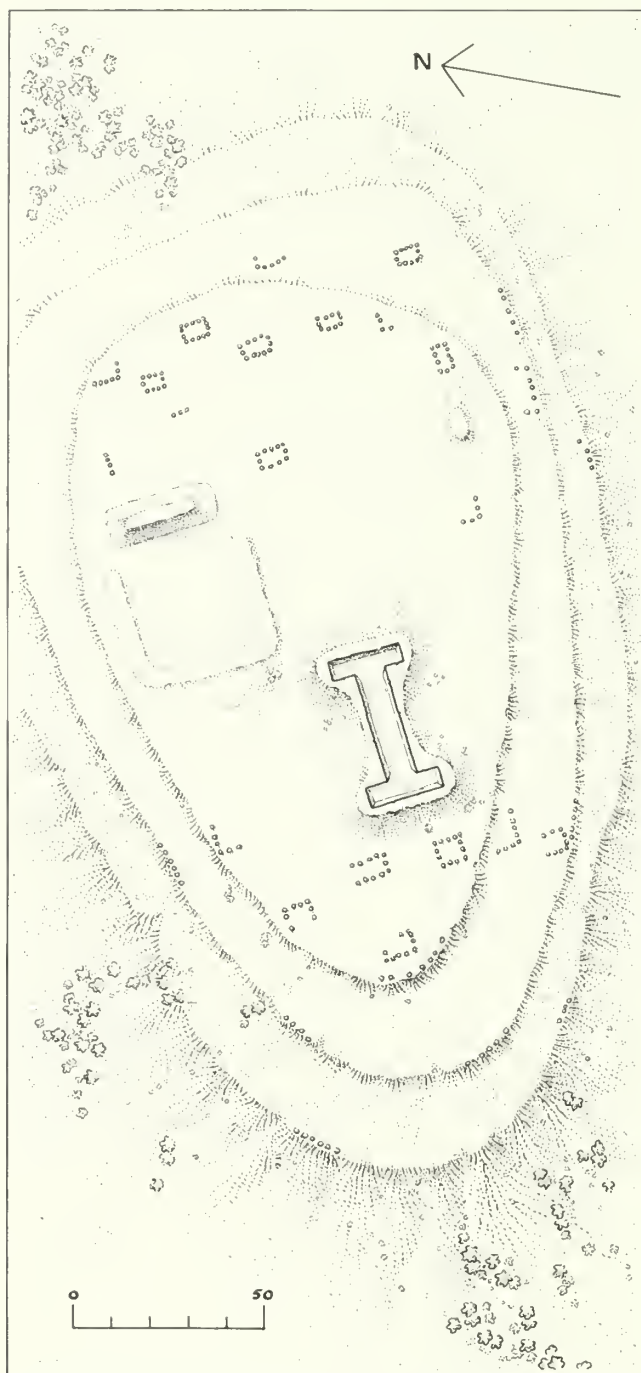


Fig. 166. Sketch map of Site Tr 79, a Palo Blanco satellite village.

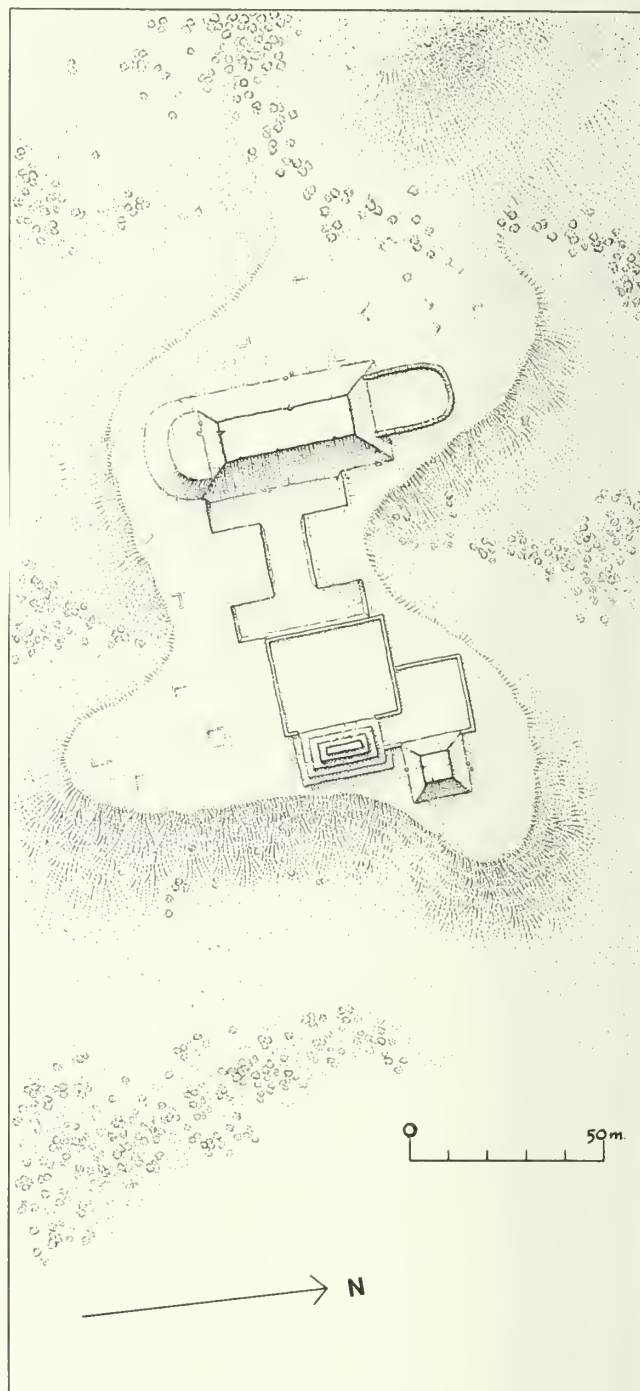


Fig. 167. A reconstruction of Site Tr 41, an Early Palo Blanco nucleated town, based upon survey sketch map.

this nucleated hilltop town is situated on a north-south oriented hill 150 m. north of the Tehuacan-Teotitlan del Camino highway and just east of the Rio Comulco (6.0 km. southeast of San Sebastian Zinacatepec and 2.8 km. west of Calipan). The summit and portions of the flanks of this hill had been leveled by the construction of terraces outlined with low walls of unmodified basalt boulders. Within these boulder borders were three plazas outlined by about 20 mounds. Surrounding the adjacent plazas and their mounds were about 30 house foundations.

Tr 69. This small hamlet is located in the northeast quadrant of the Tehuacan Valley, approximately 6 km. due north of San Sebastian Zinacatepec and 1.5 km. northeast of Ajalpan. The remnants of about ten rectangular foundations were found on the summit and small terraces of a small hill.

Tr 364. This village is located in the west-central part of the Tehuacan Valley about 5.7 km. south of the village of San Marcos and 2.5 km. northwest of San Gabriel Chilac. A single mound in an area about 50 by 100 meters is situated on a small, long, northwest-southeast oriented hill and the hillside that has been terraced with large blocks of stone.

Tr 249. East-centrally located within the valley of Tehuacan, this hamlet of house foundations is situated atop the circular summit, about 50 m. in diameter, of an east-west oriented, elliptically-shaped hill that is located on the west bank of the Rio Comulco. It is approximately 5.5 km. southeast of San Sebastian Zinacatepec and 3.2 km. west-northwest of Calipan.

Tr 301. South of the Tehuacan Valley and in the state of Oaxaca, this large nuclear town is approximately 11.5 km. south-southwest of Teotitlan del Camino and 4.3 km. southwest of San Juan Los Cues. *Tr 301* is situated on the terraced flanks and summit of a very large hill, located just west of the Rio Salado. Most of the natural terraces on the north, south, and southeast flanks of the hill have been leveled by the construction of low terracing walls made of unmodified boulders. Although the high walls of large boulders that almost completely outline the summit of the hill may have been built for defensive purposes, it seems more likely that they functioned as huge terracing walls to level, and perhaps even enlarge, the top of the hill.

A large, 8-m.-high platform mound, located at the northern extreme of the summit, dominated that architecture constructed atop the hill. This mound was built at the north edge of a large plaza area that was bordered to the east and west by single, long, north-

south oriented mounds about 4 m. in height. The south end of this plaza appears to be open. The only other major architectural feature noted on the summit was a large (about 6 m. high), long, east-west oriented mound situated on a projection of land forming the southwest corner of the hilltop.

North of the summit, on a large, high terrace of the hill, were found the remains of a looted multi-chambered tomb which was surrounded by small mounds and house foundations.

South of the summit, on a large terrace, apparently a few meters higher than the terrace on which the multi-chambered tomb was built, was located a large (6 m. high), long, generally east-west oriented mound. This mound and nearby smaller architectural features had been much disturbed by looters.

The final major architectural features noted at *Tr 301* were situated on a fairly large terrace to the southeast of the summit and only about 30 m. above the Rio Salado. An I-shaped ball court had been built near the center of the terrace. Oriented in a north-northwest by south-southeast direction, the court was constructed of earth and rubble and faced with cobbles and boulders.

Four small (2 to 3 m. high) mounds had been constructed on the terrace in a rectangular arrangement surrounding the ball court. Perhaps as many as 20 more small mounds and numerous U-shaped or rectangular house foundations were constructed on the many small natural and artificial terraces located at varying elevations on the hill.

Tr 104. This village site represented by house foundations was discovered in the south-central portion of the Tehuacan Valley, about 1.7 km. southwest of San José Tilapa and 2.7 km. northeast of San Antonio Nahuatipan. It is situated on the flanks and summits of two small hills located about 50 m. from one another.

Tr 84. This village is located in the southeastern portion of the valley, on a conical hilltop some 300 meters in diameter and is known locally as the Cerro Mirador. It is about 1.5 km. north-northeast of San José Tilapa and 4.5 km. east of San Rafael. The hillside was terraced with large river boulders and about 40 rectangular house foundations had been built on the terrace and atop the hill. The hilltop, however, was dominated by five large, rock-filled platform mounds that surround a square-shaped plaza.

Tr 217. This village is represented by a single mound on a long low hill oriented east-west and is located in the west-central portion of the Tehuacan Valley some 5 km. south-southeast of San Gabriel Chilac, 3.7 km.

west-southwest of San José Miahuatlan, and 500 m. south-southeast of the village of San Mateo Tlacoxcalco.

Tr 300. A village site located to the south of the Tehuacan Valley, only about 300 m. west of the Presidencia in the town of San Juan Los Cues, Oaxaca, and 5.7 km. east of the confluence of the Rio Xiquila and the Rio Salado. The entire hilltop, about 30 m. above the valley floor, had been artificially flattened and architectural terraces were present along the northeast flank of the hill. A single, large (about 20 m. in diameter), conical-shaped mound was constructed at the east end of the hill and about 10 small house mounds were found to the west.

Tr 303. A prehistoric village was found to the south of the Tehuacan Valley on a hilltop about 1 kilometer directly east of San Juan Los Cues, Oaxaca, 5.75 km. south-southeast of San Martín Toxpala. The summit of the hill and terraced hillsides were characterized by small, rectangular "house" mounds, 2 destroyed pyramids, and house foundations, which have been torn apart by looters.

Tr 356. A hilltop village located in the northwest section of the valley of Tehuacan approximately 6.2 km. west-southwest of the present city of Tehuacan and 6.2 km. west-northwest of the village of Coapan. *Tr 356* is situated on the summit of a north-south oriented, elliptically-shaped hill that is part of the Cerro Tecuantepetl. It overlooks the large, natural terrace known as Cerro de La Mesa to the north and the valley floor to the east as well as *Tr 41* to the southeast. The hilltop was surrounded by a wall of stone blocks and slabs that probably functioned to level the hilltop and retard erosion. Architecturally, *Tr 356* consisted of 4 platform mounds around a north-south oriented plaza and 4–5 house foundations of stone blocks and slabs. Traces of what appears to be a terraced path lead to the town *Tr 41* and can be taken as evidence that *Tr 356* was a suburb of it.

Tr 309. *Tr 309* is located south of the Tehuacan Valley approximately 3 km. southeast of the town San Juan Los Cues, Oaxaca, and 8 km. east-southeast of the confluence of the Rio Xiquila and the Rio Salado. The site is situated on the flanks and atop a long east-west oriented hill, with some architecture evident on the small terrace overlooking the barranca "Platanillo" just north of the hill. On the east end of the hill are two east-west oriented mounds forming a plaza while on the west end three mounds form a U-shaped plaza opening to the east. Between the two, on the north

flank of the hill, is an I-shaped ball court. House mounds on foundations are scattered between the plazas and down the flanks of the hill.

Tr 205. Located in the east-central part of the Tehuacan Valley, this site is approximately 4 km. south-southeast of San Sebastian Zinacatepec and 5.5 km. west-northwest of Calipan just east of the Rio Salado on the valley floor. The area of occupation appears to be concentrated on two north-south oriented hills joined by a causeway-like ridge of land. The north hill has mainly Palo Blanco sherds on it, but some sort of early occupation may underlay the Early Venta Salada remains on the south hill, for a deep pit uncovered a rectangular slab-lined tomb with El Riego gray sherds. Several large earth mounds with stone slab facings and about 40 house foundations of slabs characterize the architecture atop the north hill and on its terraces. Most of the architecture has been at least partially destroyed by looters.

Tr 281. This ancient town site is located in the extreme north portion of the valley of Tehuacan approximately 2 km. east of Cuayacatepec. It is situated on the summit of a large roughly L-shaped hill, the short length oriented to the northwest and the longer arm oriented to the southwest. Near the southwest end of the hill, five smaller mounds are grouped around a much larger platform mound or pyramid. Another six small mounds along the remainder of the hilltop to the east and north are grouped in pairs which are parallel to the side of the hill and could be bordering three plazas or ball courts. Located just northwest of the last pair of mounds, between the mounds and the northwest end of the hill, was a feature much resembling an I-shaped ball court, northwest-southeast oriented. There has been a great deal of destruction by looters and by those taking stone for modern construction in the town of Cuayacatepec.

Tr 113. This site is located in the southeast part of the Valley of Tehuacan on La Loma Chica, about 1 km. southeast of San José Tilapa and 3.5 km. northwest of Teotitlan del Camino, just east of the old dirt road from Tehuacan to Teotitlan del Camino. The architecture present consists of narrow agricultural terraces along the flanks of the hill, while atop the hill are 8 to 10 rectangular house foundations, and a single rock pile that represents a platform mound.

Tr 76. *Tr 76* is located in the southeast portion of the Tehuacan Valley, some 5.5 km. north-northwest of Teotitlan del Camino and 900 m. north-northeast of San José Tilapa. Situated on a long southwest by

northeast oriented hill, the hamlet consists of about 20 rectangular house foundations, many of which were built around patios. Construction materials consisted of unmodified river boulders and crudely-shaped blocks and slabs of stone. Many of these foundations were located on several large terraces along the sides of the hill.

Tr 144. Tr 144 is located in the south-central part of the Tehuacan Valley in the state of Oaxaca, approximately 3.2 km. west-northwest of Teotitlan del Camino and 2.7 km. east of San Antonio Nanahuatipan. This nuclear town is situated atop and on the flanks of four closely-grouped hills, called 144A, 144B, 144C, and 144D, roughly arranged in two parallel, east-west lines of two hills each. Three of the hilltops were leveled and recently badly looted, but the remnants of retaining or terracing walls of boulders once encompassing the summits are still visible. The architecture on these hills was characterized by a few small mounds and perhaps as many as 100 rectangular foundations of cut blocks of stone.

The very fact that the fourth, 144D, and southwesternmost of the hills was not completely flattened has undoubtedly saved its architecture from destruction by cultivation, although it has been somewhat disturbed by looters. The 30 m. wide by 200 m. long upper portion of this east-west oriented hill has been modified into a series of terraced areas that extend down both sides of the long axis of the hill, about one-quarter of the distance from the summit to its base. These terraces are bordered with low walls of unmodified boulders and range from one to three courses (about 75 cm.) in height. Ascending the hill from the east, the first terrace had an east-west oriented plaza that was encompassed by four small mounds. The next 1.5 higher terraced area to the west had an arrangement of long, low mounds situated around two adjacent plazas. The easternmost of these two plazas opened toward the north and east, and was flanked to the west and south by two mounds. The mound flanking the west edge of this plaza also served as the eastern flanking element for the second plaza on the terrace. This second plaza to the west opened only to the north, being flanked to the east, west, and south by mounds. All of the mounds visible appear to have been constructed of earth and rubble with a facing of dressed stone and unmodified boulders. A narrow dip or "saddle" separates the terrace described above from the next, and highest, terrace on the hilltop. The edges of this 1 m. wide by 15 m. long saddle-like causeway have been lined with slabs set on edge in the earth. Rising about 3 m. above the lowest point in the nar-

row causeway and 1.5 m. above the terrace having the two plazas, the next terrace to the west was 8 m. wide by 33 m. long. A single earth and rubble mound, 6 by 8 m., and 75 cm. high, located in the north-central portion of the terrace, was the only architectural feature noted. West of this highest terrace were located two minor terraces. Immediately to the west and about 2 m. lower in elevation was a small 4 by 4 m. terrace with no architectural features observable. The final terrace showing modification and use was 1.5 m. lower and just west of the 4 by 4 m. terrace. At approximately the same elevation as the easternmost terrace with the plaza surrounded by 4 mounds, this westernmost terrace was about 20 by 20 m. in size. It was characterized by two partially destroyed house foundations made of boulders and located in a northwest line on the western half of the terrace.

Tr 153. This prehistoric town is located in the southwest quadrant of the Tehuacan Valley some 6.2 km. west-southwest of Coxcatlan and 1.2 km. north of the small town of Axusco. Tr 153 was founded on a tall, irregularly-shaped hill, the flanks, peaks, and ridges of which had been leveled by terracing. Separated into noncontiguous areas of varying size, architectural features consisted of from forty to sixty low house foundations of only slightly-shaped stone blocks and 15 or 16 earth platform mounds faced with unmodified cobbles and boulders. There were at least 3 widely separated plazas surrounded by 4 mounds apiece.

Tr 132. This village is located in the southeast section of the Tehuacan Valley approximately 1.5 km. northeast of the town of San Rafael and 4 km. northwest of San José Tilapa. Tr 132 is situated atop a very high, long, narrow hill and the only architecture associated with this site consists of a single platform mound, located on the southwest portion of the hill. Covering this mound were hundreds of fragments of the figure-shaped incense burners known throughout the valley as xantiles (MacNeish: Vol. 3).

Tr 180. Discovered in the east-central section of the Tehuacan Valley, this area of occupation extends from about 200 m. south of Calipan to a point 1 km. northwest of Coxcatlan. Approximately 20 of the 30 small hills within this 1 by 2.2 km. area are characterized by the presence of about one hundred house foundations. These foundations were situated on the summits as well as on natural and artificial terraces along the sides of the hills. A large number have been scattered and destroyed by looters and modern residents in search of building materials.

Tr 169. Found in the southwest part of the Tehuacan Valley, Tr 169 is about 3.5 km. west-northwest of the town of Pueblo Nuevo and 800 m. southeast of Axusco. The village was situated on an elliptically-shaped, northwest-southeast oriented hill called the Cerro Tepezala, one of several hills comprising the Cerro Portezuelo. Cut block rectangular house foundations were built on the upper terraces, while small mounds were located along the west flank of the hill at its base.

Tr 304. South of the Tehuacan Valley, this ancient village site is located about 1 km. southeast of San Juan Los Cues, Oaxaca, and 6.5 km. east-southeast of the confluence of the Rio Xiquila with the Rio Salado. It is situated near the base and on the middle prominences of the terraced, southwest flank of the large hill, just east of San Juan Los Cues. Between 75 and 100 building foundations and perhaps as many as 20 low mounds were found on the numerous natural and artificial terraces. Unmodified and shaped river boulders were used in the construction of the foundations and to face the mounds. In addition to these features, remnants of what appear to be the stuccoed floors of structures and patios were also noted.

Tr 302. Tr 302 is a large village located south of the Tehuacan Valley in the state of Oaxaca, about 5.1 km. south-southeast of San Martín Toxpala and 1 km. northeast of San Juan Los Cues. The village was built on several large, natural, but modified terraces about halfway up the south side of a large hill, some 30 m. above the river, on the north bank of the Arroyo de Los Cues. The site was made up of about 15 small mounds and 30 structure foundations.

Tr 101. Located in the southeast portion of the Tehuacan Valley, Tr 101 is about 8 km. southeast of Pueblo Nuevo and 1.6 km. north-northeast of San José Tilapa. At least six earth mounds and about 60 house foundations made of basalt boulders were constructed on, and at the base of, a large, high, T-shaped hill.

Tr 280. Tr 280 is located in the extreme northwest portion of the Tehuacan Valley, approximately 2 km. west of Madero in the Municipio of San Bartolo Teontepec. Sherds were picked up from an area about 100 by 200 m. in size. As the village was situated on a part of the valley floors, now under intensive cultivation, little remains of the associated architectural features—the remnants of 8 mounds constructed of earth and rubble, the largest of which now stands about 5 m. high, and a single, 40-m.-long, north-south oriented rectangular ball court were the only structures noted by the survey.

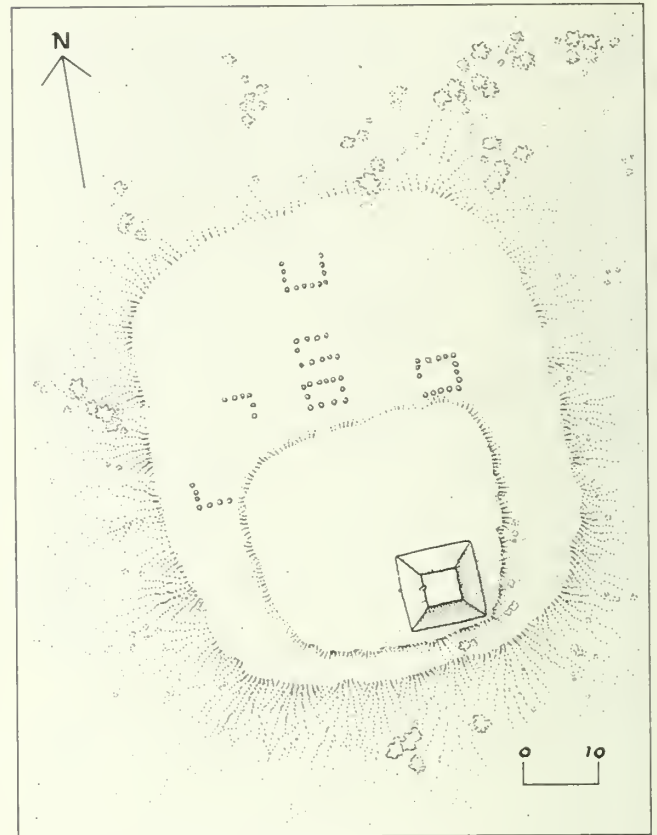


Fig. 168. Sketch map of Site Tr 143, an Early Palo Blanco hilltop village.

Tr 183. This village was discovered in the east-central part of the valley of Tehuacan, some 3.7 km. northwest of Coxcatlan and 700 m. west-southwest of Calipan. Situated on the south end of a low, east-south oriented, L-shaped hill, Tr 183 had only 5 structures built of stone. Two of these were large mounds that had been constructed in an east-west line near the north edge of the site. A smaller mound was located near the southeast corner of the site, while the boulder foundations of two one-room structures were found near the southwest corner. The generally square, flat, open area flanked by these architectural features was probably a plaza.

Tr 143. This small village is situated on a long, low, generally east-west oriented hill or ridge, about 3.7 km. west-northwest of Teotitlan del Camino and 2.2 km. east of San Antonio Nanahuatipan in the south-central portion of the valley. Architecture consists of a single, small mound located near the southeast edge of the site and roughly-cut boulder foundations of five or six houses to the north and northwest. There appears

to be a leveled plaza-like area, about 20 by 30 m. in size, between the rubble-faced earth mound and the small foundations.

Tr 182. Located in the east-central section of the Tehuacan Valley, the ruins of this prehistoric village are about 3.9 km. northwest of Coxcatlan, 500 m. west of Calipan, and 50 m. north of the Tehuacan to Teotitlan del Camino highway. *Tr 182* is situated on the long, low, east-west oriented arm of an L-shaped hill. The east end is characterized by house foundations located among several huge boulders. The west end of the site has a few boulder-faced earth mounds, as well as more boulder-founded structures.

Tr 90. South-centrally located in the Tehuacan Valley, *Tr 90* is some 4.7 km. southwest of the town of Coxcatlan and 1.8 km. northeast of Axusco. It is situated on the summit and flanks of an elliptically-shaped, north-south oriented hill. The remains of about 10 looted platform mounds were discovered on the summit. At least another 20 small house platform mounds, also badly vandalized, had been constructed on the artificially-terraced flanks of the hill. These small mounds of foundations and the retaining walls bordering the terraces were also constructed of stone blocks. A large excavation that appears to be a prehistoric quarry was located on the southwest side of the hill near the summit.

Tr 224. This nuclear village is located in the northwest portion of the Tehuacan Valley about 7 km. south-southeast of Tehuacan and 300 m. due west of San Marcos. Situated on the valley floor, *Tr 224* consists of four stone-faced mounds around a plaza.

Tr 106. This dispersed hilltop town is located in the south-central portion of the Tehuacan Valley, 3.7 km. southwest of San José Tilapa and 400 meters northeast of San Antonio Nanahuatipan. It is located on five small hills and in an adjacent portion of the valley to the northeast. This lowland part consists of boulder house platforms and plazas outlined by boulders. To the west of it are a series of three hills oriented roughly north and south. The northernmost hill (area 2) has a series of boulder house foundations. The central hill (area 3) has a pyramid at its summit with house foundations around it. The southernmost of this group (area 4) has, in the north end, a mound or small pyramid and 8 house foundations around on its east side, and a pyramid south of it with a U-shaped causeway on it. These three surround a U-shaped plaza open to the west. There are also house foundations on the flank of this hill. The other two hills, also oriented

north and south, are to the west of the one just mentioned. The hill to the southwest (area 5) has three plaza areas; one on the north, U-shaped and open to the north, has three pyramids around it; the central and southern plazas are inside, U-shaped, causeways that open to the west and contain boulder house foundations. There are three other mounds on the flanks of the hill. The final hill to the northwest has at least four terraced plaza areas with many house foundations on them. All in all, it is a very complex settlement.

Tr 103. Located in the south-central part of the valley of Tehuacan, *Tr 103* is approximately 500 m. south-southwest of San José Tilapa and 3.8 km. northeast of San Antonio Nanahuatipan. It is situated on and around three low hills, on a long, relatively low ridge, extending southwest from Tilapa toward Nanahuatipan. This large village can be divided into three distinct areas of construction. Two of these are small, low adjoining hills or knolls, located at the south end of the site. The remains of about 15 building foundations of unmodified boulders characterize the architecture on the artificially-terraced summits and flanks, as well as around the base of these small hills. They were separated from the third and largest clustering of architecture by a level area some 75 m. in length, littered with many potsherds. The portion of *Tr 103* which forms the north end of the site is also situated on a very low flat hill or knoll. The majority of the structures on this hill were in a J-shaped arrangement and consisted of square and rectangular building foundations constructed of unmodified boulders or unmodified and slightly-shaped blocks of stone. Located near the center of the longer arm of the "J" was a platform mound bordered to the north and south by building foundations. Directly west of this platform was a rectangular, north-south oriented, ball court.

Tr 109. *Tr 109* was discovered in the southwest portion of the Tehuacan Valley, approximately 3.8 km. southwest of San José Tilapa and 1.3 km. north-northwest of San Antonio Nanahuatipan, situated on the summit and flanks of a long hill. Architecturally, the hamlet consists of the remnants of several boulder-founded structures located on the terraced summit and flanks of the small hill.

Tr 275. This prehistoric village is located in the extreme northeast portion of the Tehuacan Valley, about 4.4 km. north of Tehuacan, 5.8 km. north-northeast of San Lorenzo, and 7.6 km. east-northeast of Teotipilco. Located on the artificially-terraced summit were two platform mounds of earth and limestone slabs, and a

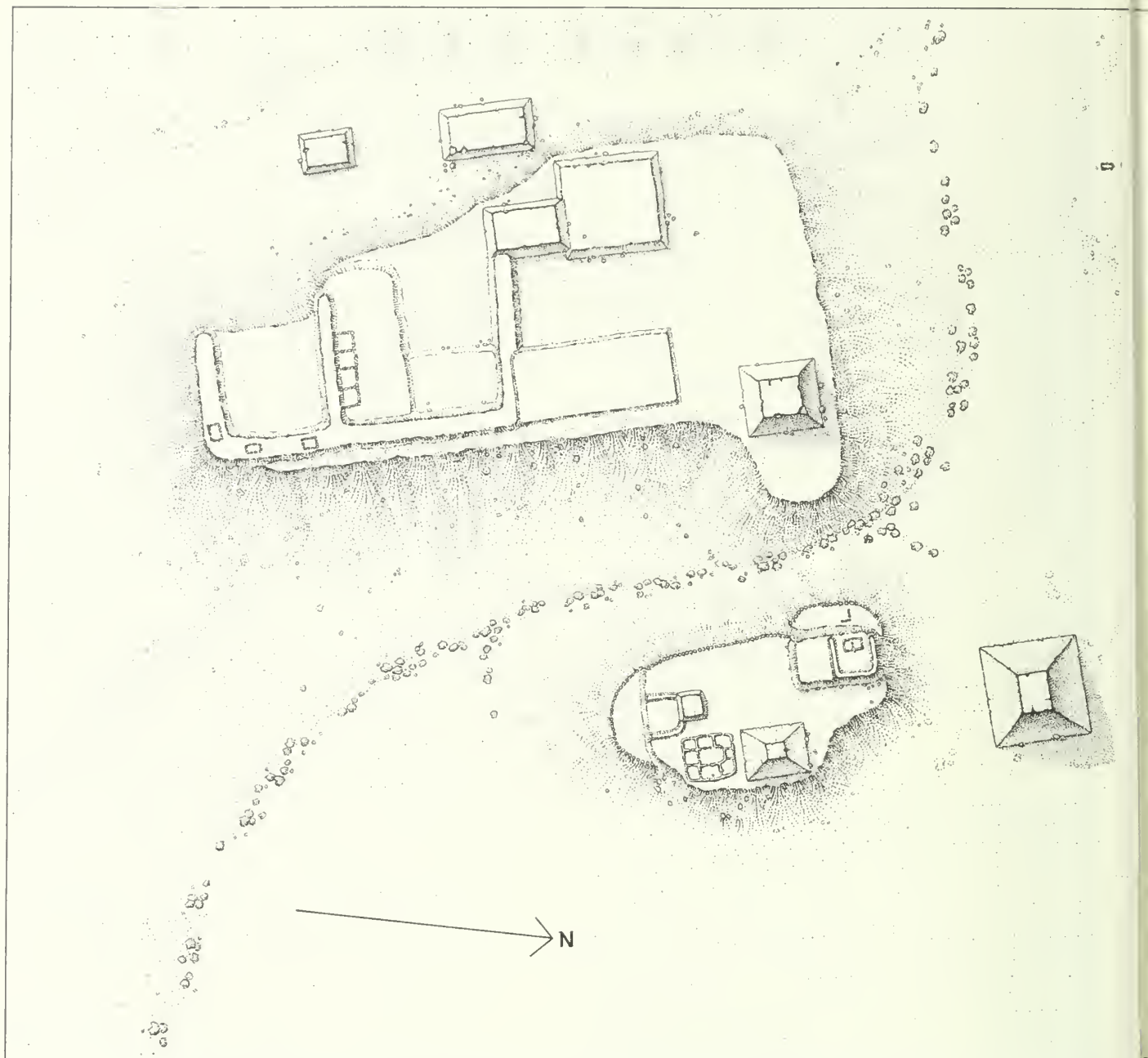
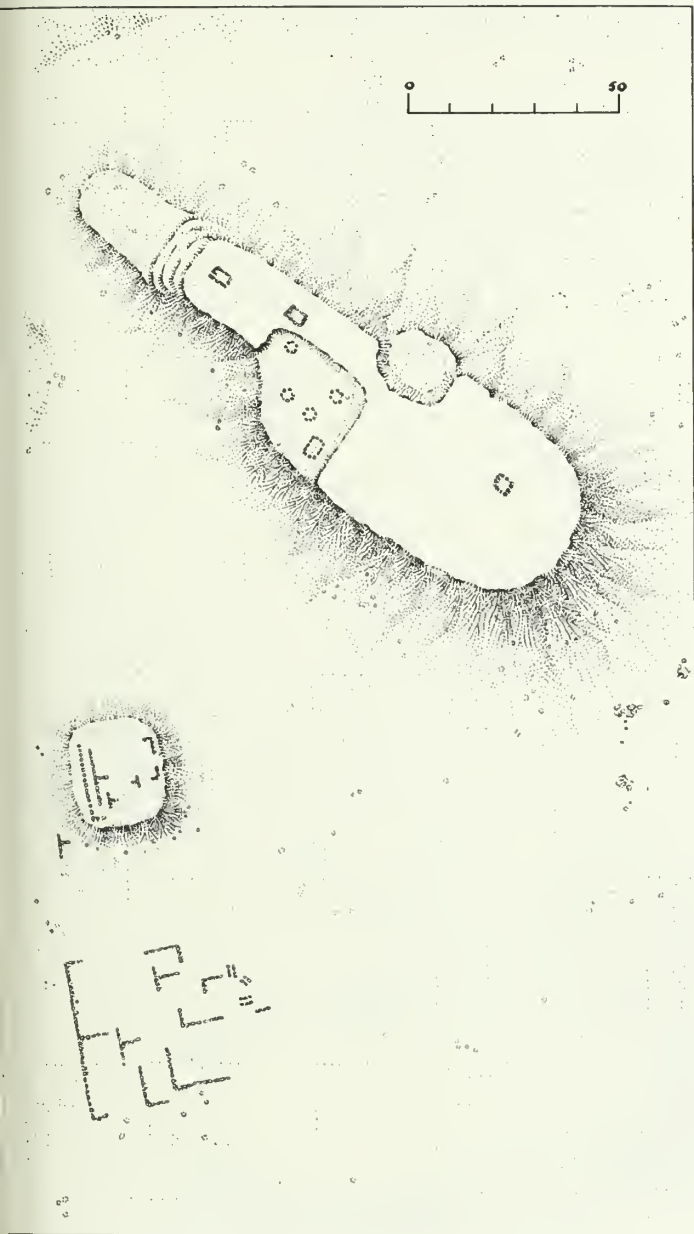


Fig. 169. A reconstruction of Site Tr 106, an Early Palo Blanco dispersed hilltop town, based upon survey sketch m.



ig. 169 continued)

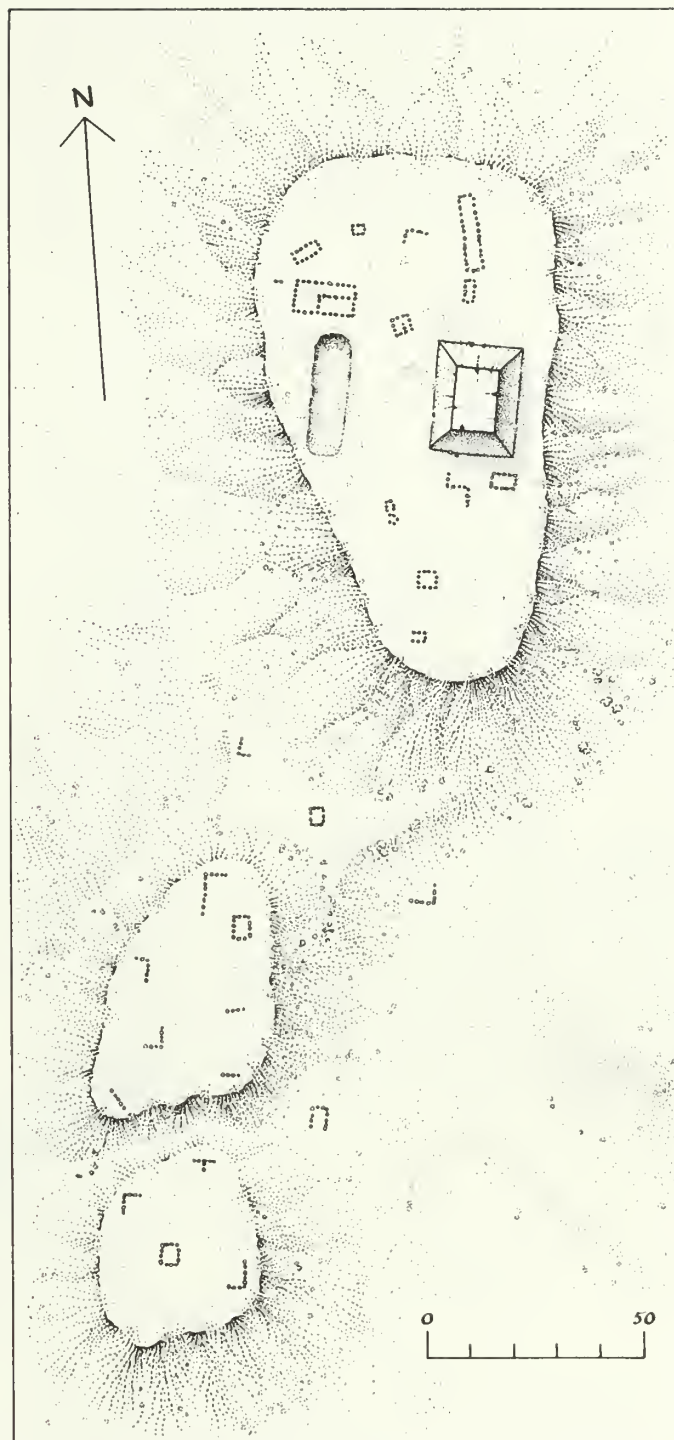


Fig. 170. Sketch map of Site Tr 103, an Early Palo Blanco dispersed hilltop village.

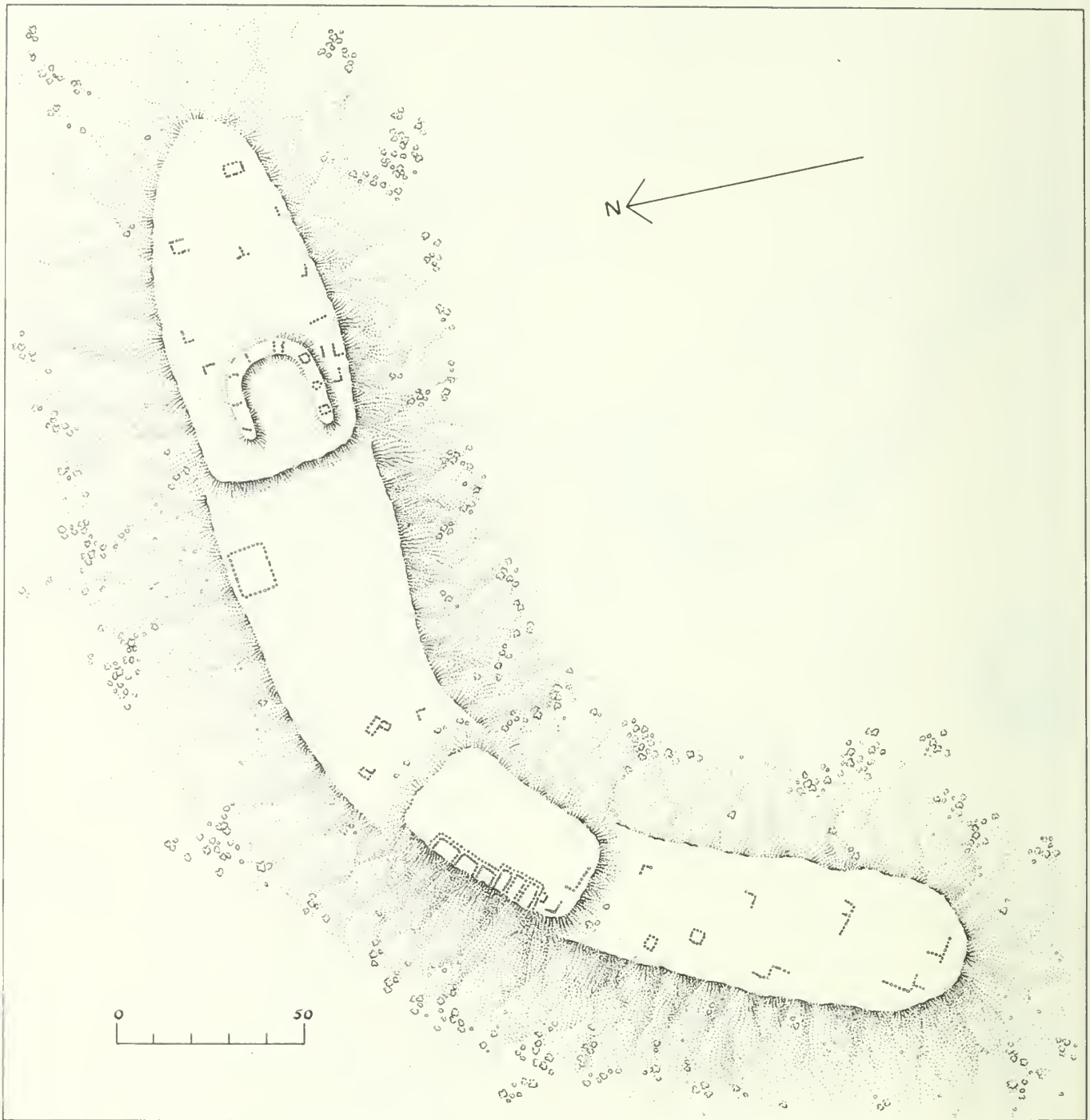


Fig. 171. Sketch map of Site Tr 146, an Early Palo Blanco hilltop village.

single, long, building foundation. Remnants of a few badly eroded, natural and artificial, possibly agricultural, terraces were noted on the south and east flanks of the hill.

Tr 234. *Tr 234* is located in the northeast quadrant of the Tehuacan Valley, 7.9 km. east-southeast of Tehuacan, 6.6 km. north-northwest of Altepexi, and 1.2 km. north-northeast of the village of Santa Cruz. It was situated on a low, flat hill or knoll just north and west of the Rio Salado. Only a few alignments of stone slabs, apparently representing building foundations, were discovered.

Tr 146. This village is located in the southwest section of the Tehuacan Valley, 5.6 km. west-northwest of Teotitlan del Camino and 300 m. east of San Antonio Nanahuatipan. It is situated on the terraced summit of a 350 m. long by 30 to 40 m. wide, 25–35 m. high, L-shaped hill, located just northeast of the El Calvario de San Antonio Nanahuatipan shrine. The southern 100 meters of the hill, beginning at the end nearest the El Calvario shrine, is oriented north-south, and, like other sections of the hill, is partially outlined at its summit by a low wall of unmodified boulders. The boulder foundations of at least 4 one-room and 4 two-room structures were found on this part of the hill.

For approximately the next 50 meters, the orientation of the hill changes to a generally southwest-northeast direction and its summit rises to an elevation about 2.5 m. above the southern portion of the hill. Constructed along the north edge was a single line of six contiguous rooms. The foundations of these rooms were made of two parallel rows of unmodified boulders, one to two courses in height. Near the southeast corner a single 4 by 6 m. room was constructed in the same manner as the contiguous rooms it opposes. The level, open area, between the structures and occupying the southwest portion of this section of the summit, probably served as a plaza.

Continuing east, one descends in two narrow, 1.5 m. high, step-like terraces to the next leveled section of the hill. Approximately 35 m. in maximum width and 100 m. in length, this area is oriented almost due east-west. The remnants of at least three building foundations were found on the west half of this particular terrace. Two of the structures had but one room while the third had two contiguous rooms joined in such a manner as to make it L-shaped in plan. In addition to these foundations and the few remnants of the low terracing wall outlining the summit, the only other architectural feature noted was a boulder plaza located along the north edge of the summit.

The final 100 meters of the summit is also oriented east-west, but rises to an elevation of about 1.5 m. higher than the portion of the summit immediately to the west. The predominant architectural feature found here, located near the center, was a rectangular causeway-like structure, or 4 rectangular mounds, around a plaza. House foundations occurred both on this structure and on the terrace east and west of it.

Tr 251. This area of occupation on a large hill is located in the extreme northwest portion of the Tehuacan Valley, some 16 km. northwest of Tehuacan and about 800 m. south-southwest of the town of San Cristobal Topotiopan. Eight of the larger mounds are arranged around two large U-shaped plazas, both opening to the south. The north plaza is smaller than the south one. Just southwest of a large stepped pyramid on the east side of the north plaza is an I-shaped ball court, about 40 m. in length and oriented in a general north-northwest by south-southeast direction. It perhaps represents the west side, and the north pyramid of the south plaza represents the east side of still another nested U-shaped plaza, open to the south. Both north and south of this central area are about 40 small mound or rectangular house foundations.

Tr 290. South-centrally located in the Valley of Tehuacan, *Tr 290* is some 2.5 km. west-northwest of San Martín Toxpala and 1.9 km. southwest of Teotitlan del Camino. The site is situated on the flattened tops and flanks of three large, elliptically-shaped hills that are arranged in a gentle west-southwest—east-northeast orientation. The frustratingly brief survey notes state, "Each hill has flank terraces, house foundations, mounds."

Ts 204 is described in Chapter 5.

Cave Sites

Tc 307, Zone A, is described in Chapter 3.

Tc 272, Zones F, F north, E north, E south, D north, and D are described in Chapter 3.

Tc 50, Zone VI, Floors 20–23, are described in Chapter 6.

Tc 31. This small rock shelter is located in the Barranca de los Coyotes in the northwestern section of the Tehuacan Valley. The barranca cuts into the Cerro de la Mesa cliffs nearly one kilometer west of the El Riego Hotel. It had been badly looted.

Tc 13. This rock shelter is located in the north-central section of the Tehuacan Valley, approximately 9.5 km.

TABLE 32
Early Palo Blanco Seasonality Data

		Tc 307, A	Tc 272, F, 1	Tc 272, F, 2	Tc 50, VII, floor 20, A	Tc 50, VI, floor 20, B,C	Tc 50, VI, floor 21, A	Tc 50, VI, floor 22 A	Tc 50, VI, floor 23, A-C	Tc 272, E, 1-2	Tc 272, E, 1	Tc 272, D, 2-3	Tc 272, D, 1	Tc 31	Tc 13	Tc 8	Tc 11	Tc 12	Tc 34	Tc 10	Tc 9	Tc 6
MICRO-ENVIRONMENTS																						
El Riego Oasis														X					X			
Travertine Slopes																						
slopes															X	X	X	X		X	X	X
Alluvial Slopes																						
valley flanks					X	X	X	X	X													
Canyon and Dissected Alluvial Slopes																						
canyon flanks		X	X	X						X	X	X	X									
SEASONALITY																						
Fall	{	CIRUELA FRUIT			X	X			?		X	X										
		AVOCADO FRUIT					X		?			X										
CHUPANDILLA FRUIT				X	X	X	X	X	X		X	X	X?									
SAPOTE FRUIT				X		X	X					X										
Summer	{	FETAL DEER					X															
		Squash					X				X											
Corn			X	X	X	X	X	X	X	X	X	X	X									
Peppers						X																
	{	Lizard				X					X											
		milling stones	X	X	X	X	X	X	X	X	X	X	X	X								
Mesquite seed						X				X												
Grass seed			X	X		X	X		X	X	X	X	X									
Spring	{	Setaria seed				X	X		X	X												
		Cardon seed					X				X											
Leucaena seed			X																			
Pochote pods			X	X	X	X		?	X				X									
Winter	{	TETECHU FRUIT								X												
COYOL FRUIT			X		X	X		X			X	X	X									
COSAHIICO FRUIT				X		X	X	X	X		X	X										
Fall																						
COMPONENT DIMENSIONS																						
length in meters		8	13	6	5	10	8	6	6	15	4	10	11	8	20	6	15	15	8	5	10	6
width in meters		5	5	3	2	6	5	5	5	4	6	3	4	4	4	3	2	5	6	3	4	4
extent in sq. meters (829)		40	65	18	20	60	60	30	30	53	19	30	42	32	80	18	30	75	48	15	40	24
SETTLEMENT FEATURES																						
cave niche burials														X					X			
slab-lined burial pit						2																
cache pit				1		2																
fire pit			1			1			1	2	1		1									
storage pit		X				3	1															
roasting pit			1	1				1	1	1												
fired area												1	1									
SETTLEMENT PATTERN TYPES																						
Macroband spring camp			X							X												
Microband multi-season camps																						
spring-summer					X		X															
summer-fall									X													
Microband wet-season camps		X																				
spring													X									
Microband fall camps				X		X		X			X	X								X	X	X
Microband dry season camps															X	X	X	X				
Microband dry water-source camps														X					X			

southeast of Tehuacan and 6.0 km. north of San Gabriel Chilac. Tc 13 is situated about 30 meters above the valley floor in the face of the San Andrés cliffs and opens toward the southeast.

Tc 8. Tc 8 was discovered in the north-central section of the Tehuacan Valley about 9.5 km. south-southeast of Tehuacan and 6.0 km. north of San Gabriel Chilac. This shelter or cave is situated some 30 meters above the valley floor in the San Andrés cliffs and opens toward the southeast. A small test quickly revealed the floor fill to be quite shallow. This, in addition to the moist nature of the cave, rendered further excavation impractical.

Tc 11. Tc 11 was found in the north-central portion of the Tehuacan Valley about 6.0 km. north of San Gabriel Chilac and 9.5 km. southeast of Tehuacan. Situated in the face of the San Andrés cliffs, this rock shelter is about 25 meters above the plain and opens to the southeast.

Tc 12. Located in the north-central portion of the Tehuacan Valley, this rock shelter is about 9.5 km. south-east of the city of Tehuacan and 6 km. north of San Gabriel Chilac. It is situated some 25 meters above the valley floor in the face of the San Andrés cliffs, and opens toward the southeast.

Tc 34. This cave, opening to the east, is located in the northwest portion of the Tehuacan Valley about 2.8 km. west-southwest of Tehuacan, 1 km. west of the El Riego Hotel, and 2.5 km. south of the town of San Lorenzo. It is situated some 20 m. above the valley floor in the south wall of a ravine called the "Barranca del Rancho" (also known as the "Barranca del Palo Blanco") which cuts into the east face of the Cerro de la Mesa cliffs. A looted burial chamber was found in a small (1.5 by 1 m. and 75 cm. high) natural recess in the rear wall of the cave that had been sealed with a jacal or wattle-and-daub wall. Although small test excavations showed this cave to have fairly deep and dry floor fill deposits, it was abandoned in favor of El Riego Cave (Tc 35), directly across the barranca from this site, because of its deeper deposits and longer span of occupation.

Tc 10. This cave is located in the north-central portion of the Tehuacan Valley, approximately 9.5 km. south-east of the city of Tehuacan and 6.2 km. north of San Gabriel Chilac. It is situated some 25 m. above the valley floor in the face of the San Andrés cliffs. The cave opens toward the southeast.

Tc 9. Tc 9 is located in the north-central part of the

Tehuacan Valley, some 9.6 km. southeast of Tehuacan and 5.9 km. north of San Gabriel Chilac. Situated some 30 meters above the floor of the valley, this cave is one of several formed in the face of the San Andrés cliffs. The cave has two sections, both of which open toward the southeast.

Tc 6. Located in the north-central part of the Tehuacan Valley, this cave is approximately 9.7 km. south-southeast of Tehuacan and 5.5 km. north of San Gabriel Chilac. It is situated in the face of the San Andrés cliffs, about 20 meters above the valley floor, and opens toward the southeast.

Specialized Sites

Tr 218 is described in Chapter 5.

Tr 173. In the southwest portion of the Tehuacan Valley, this site is located about 4.7 km. west-northwest of Pueblo Nuevo and 900 meters south-southwest of Axusco. Observable construction comprising this salt hamlet appears to be in three distinct clusters. The living area was evidently founded atop and on the terraced flanks of a small, roughly circular-shaped hill, while the actual work areas for the rendering of salt were located on the valley floor immediately to the east and southeast of this hill. The only form of architecture noted on the summit and terraces of the hill consisted of about 25 house foundations, ranging from 1.0 by 2.0 m. to 4.0 by 5.0 m. in size and built of unmodified and slightly shaped stone slabs. On the valley floor just east of the habitation zone were six rather amorphous mounds used in the processing of salt from highly salinated waters. They were formed around a spring, now dry, in a large, U-shaped arrangement opening toward the north. Just east of this U-shaped alignment of salt mounds were the remnants of at least one large, slab-lined, square-shaped area that appears to have served as a salt evaporation pan. Nearby were found several slab-lined cists or pits, averaging about 50 by 50 cm. in size, and a few of which contained ash and burnt earth. Some of these features may have served as fire pits for the heating of salt water, probably held in large, shallow, ceramic salt pans, to increase the rate of evaporation and render the salt from the waters more rapidly. Southeast of the house foundations and south of the U-shaped arrangement of salt mounds were an additional 12 large salt mounds formed atop natural mineral domes. Two small mineral springs were found to be still functioning among the latter group of mounds. The salt mounds discovered were composed of earth and gravel and were covered with a salty crust. They ranged

T A B L E 33
Early Palo Blanco Specialized Sites

	Tr 218	Tr 173	Tr 219	Tr 131	Tr 301	Tr 96	Tr 214	Tr 89	Tr 148	Tr 175	Tr 179	Tr 189	Tr 222	Tr 435	Tr 113	Tr 275	Tr 254	Tr 90
<i>with associated habitation with associated habitation (salt hamlets)</i>	X	X		X	X	X		X			X				X	X	X	X
MICRO-ENVIRONMENTS																		
Travertine Slopes																		
hill flanks							X			X							X	
hilltop																		
Valley Center Steppe																		
steppes	X		X	X							X							
Alluvial Slopes																		
valley flanks																		
hilltops		X			X				X						X	X		X
Canyons and Dissected Alluvial Slopes																		
canyon flanks														X				
SITE DIMENSIONS																		
length in meters		200	200	250				120	400		200	300	200					
width in meters		200	100	100				100	300		100	200	100					
extent in sq. meters		4,000	2,000	25,000				120,000	120,000		20,000	60,000	20,000					
FEATURES																		
hillside agricultural terraces					X										X		X	
valley dam																		
salt industry							X											
salt mounds			X	X						X								
range in length	18	7	30	10			1	15	60	10	200	200	6					
range in width	30-5	10	10	10					15				10-25					
range in height	5-30	4	10	2					5				10-25					
salt bins	1-3	1							1-2				3-5					
salt canals	X									X	5	X						
cooking mounds		X								X	2	X						
salt dams																		
quarries and flint-knapping											2							
tombs				2														
cemeteries																		
houses (river boulder)	X	25				15		15			60							X
length in meters						4		4			4							
width in meters						2		2			2							

from about 5.0 to 30 meters in diameter and 50 cm. to 5.0 meters in height. The majority of the pottery present on the surface of this and similar sites was of a rather undiagnostic "salt pan" or Texcoco ware.

Tr 219. Tr 219 was found in the north-central portion of the valley, approximately 2.2 km. south-southeast of the town of San Diego Chalma and 2.4 km. north of San Marcos. Situated on the valley floor, seven small rather amorphous salt mounds are divided into two groups, the north group composed of two mounds and the south group of five.

Tr 131. Discovered in the southeast section of the Tehuacan Valley, Tr 131 is about 4 km. southeast of Pueblo Nuevo and 1 km. northeast of the village of San Rafael. The site consisted of about 30 salt mounds spread over an oval east-west oriented area.

Tr 301 is described above.

Tr 96. This site is located in the southeast quadrant of the Tehuacan Valley approximately 1.5 km. northeast of the town of San José Tilapa and 5.5 km. north-northwest of Teotitlan del Camino. Situated on a hill-top, its rectangular stone block house foundations are located only on the west-southwest tip of the hill, while the east-southeast portion of the hill has been prepared for agriculture by the construction of linear borders and low terraces of unmodified igneous boulders.

Tr 214. A single salt-processing mound was located in the northwest portion of the valley, about 7.5 km. south-southeast of the city of Tehuacan and in the valley floor at the southwest edge of the village of San Marcos.

Tr 89. This salt hamlet is located in the south-central part of the valley, about 2 km. east of Axusco and 2 km. northwest of the present village of Pueblo Nuevo. It is situated on the highest terrace of the west bank of the Rio Salado, directly across from its juncture with the Arroyo Atempango. There are about 15 salt-processing mounds present.

Tr 148. This area of sixty salt production mounds was found on the valley floor in the southwest section of the Tehuacan Valley, 1 km. northeast of the present village of Ignacio Mejia, 4.5 km. west-southwest of Teotitlan del Camino, and 5.5 km. west-northwest of San Martín Toxpala.

Tr 175. This site was discovered in the southwest part of the Tehuacan Valley some 4 km. west of the present village of Pueblo Nuevo and 1.8 km. south of

Axusco. Situated on a hillside terrace on the east flank of the Cerro Tepetroje, Tr 175 is another of the many salt production sites in this section of the valley. About ten poorly-defined mounds of earth and gravel, that butt against and blend into one another, were formed around a rather large mineral spring in a general U-shaped arrangement opening toward the east. These mounds varied from about 2 to 5 m. in height and 8 to 18 m. in diameter. Some having stone slabs protruding or eroding from their summits and sides may have served as filtering plants for cooking salt cakes. At least six slab-lined salt evaporation pans, ranging from 2 by 3 m. to 5 by 10 m. in size, were located near the mineral spring within the U-shaped alignment of salt mounds. Eight house foundations, averaging about 2 by 4 m. in size, made of stone slabs were noted on the hillside to the west of the mounds.

Tr 179. This is a group of about 100 to 200 low amorphous salt mounds situated in the southwestern quadrant of the valley, about 5.5 km. south-southeast of Axusco and 4 km. due west of the present village of San Rafael. In addition to the mounds, there were about 5 groups of rectangular settling basins; small dams and canals diverted and carried the water from the nearby salt springs to the settling basins. There are approximately 60 house foundations near one group of mounds, perhaps representing the village of the salt workers.

Tr 189. Tr 189 is a large series of salt mounds located in the southwest portion of the valley floor, about one kilometer south-southeast of Axusco and 3.5 km. west-northwest of the present village of Pueblo Nuevo, at the southeastern edge of a large hill known locally as Portezuelo.

Tr 222. This salt production site is located in the north-central part of the Tehuacan Valley in the village of San Marcos, about 7.3 km. south-southeast of Tehuacan and 7.5 km. west-northwest of Altepexi. Situated on the floor of the valley, the site has an area of about 100 by 200 meters. Because the salt mounds on the valley floor which characterize this site are within the village of San Marcos and are presently used as house platforms, it was rather difficult to examine them carefully.

Tr 435, the Purron Dam, is described in Volume 4.

Tr 113 is described above.

Tr 275 is described above.

Tc 254 is described in Volume 4.

Tr 41 is described above.

Tr 90 is described above.

Indeterminate Occupations

Tr 355 and *Tr 67* (Late Santa Maria Phase) are described above.

Tr 366, Tr 174, Tr 100, Tr 99, Tr 176, Tr 227, Tr 279, Tr 298, Tr 270, Tr 287, Tr 305, Tr 346, Tr 171, Tc 200,

Tr 33, Tr 43, Tr 306, Tr 422, Tr 420, Tr 417, Tr 413, Tr 223, Tr 416, and Tr 333 (Late Palo Blanco Phase) are described below.

Tr 145, Tr 87, Tr 95, Tr 108, Tr 283, Tr 97, Tr 98, and Tr 82 (Early Venta Salada Phase) are described below.

Tr 94, Tr 75, Tr 78, Tr 139, Tr 184, and Tr 350 (Late Venta Salada Phase) are described below.

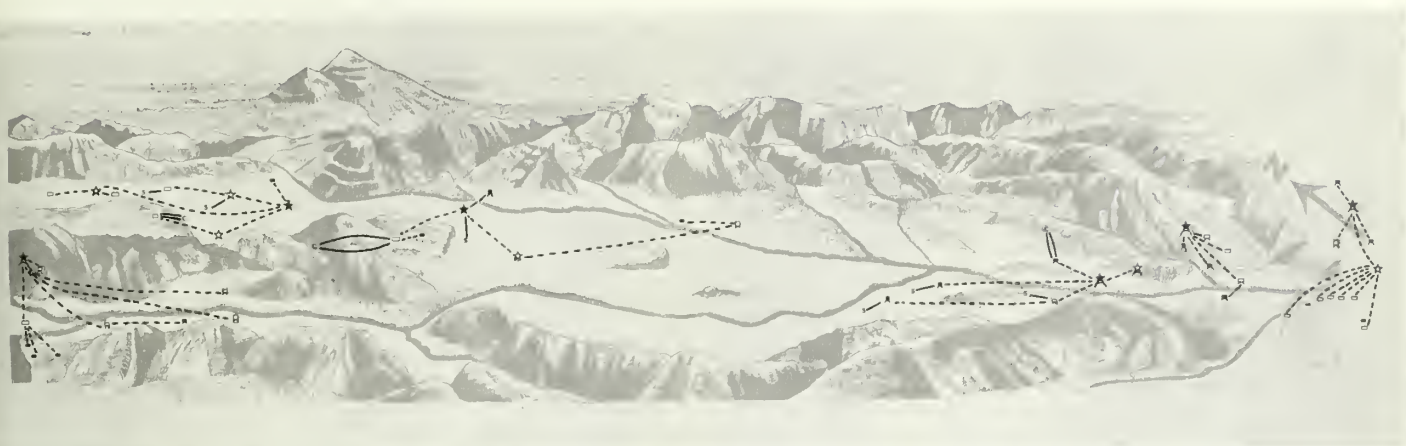


Fig. 172. The reconstructed Late Palo Blanco settlement pattern in the Tehuacan Valley.

The Late Palo Blanco Settlement Pattern

Late Palo Blanco lasted from A.D. 300 to about A.D. 700. It is one of the more poorly represented subphases of our sequence. This is due in part to the lack of precision in our classification of diagnostic ceramic types representing the subphase. Because of the exigencies of time, fewer sites were resurveyed. The relatively rigid settlement pattern of Early Palo Blanco times had begun to break down and so classification of settlement types became more difficult. The two subphases were very similar in numbers of well-recognized components; Early Palo Blanco had 79 and Late Palo Blanco, 84 occupations. The major difference was in the number of indeterminate occupations, for Early Palo Blanco had only 40, while Late Palo Blanco had 105. While a few (17) of these Late Palo Blanco components may represent occupations that had lingered on on sites built and occupied at earlier times, the majority of the sites contained but a few Palo Blanco sherds among a host of sherds and architectural features of the following Venta Salada Phase, possibly indicating small early occupations of sites that in time became larger in size, with architectural features being built over those of the earlier phase. Since the size of these earlier occupations cannot be determined, this obviously presents major problems in calculating the population for Late Palo Blanco.

Both the early and late parts of the phase had the same number of towns, fourteen, but the proportion of the settlement types has changed. While there were three nuclear steppe towns in Early Palo Blanco, there were only two later. Nuclear hilltop towns have dropped from six to five, and diffuse hilltop towns

from five to three, while a new type appears in Late Palo Blanco, diffuse valley towns, these being four in number. Thus, towns have moved down from the hills (8 as against 11 in Early Palo Blanco) and more towns are of the diffuse, rather than concentric arrangement (5 in Early Palo Blanco and 7 in Late Palo Blanco). Further, the seven nuclear towns of Late Palo Blanco do not seem as homogeneous as those of the previous subphase; the architecture is not as uniform nor do as many have evidence of the I-shaped ball court nested in with rectangular plaza areas. Further, in terms of our rough survey estimates, Late Palo Blanco towns do not seem spread over so great an area.

The number of villages for the two subphases is about the same, but, as was the case with towns, the Early Palo Blanco villages were mainly on hilltops (22) while most of the Late Palo Blanco ones were not. Only 12 of the 25 villages were found on hilltops. There is also a tendency for fewer Late Palo Blanco villages (6) to be nucleated, while most of the houses of the Early Palo Blanco Phase were concentrated around ceremonial areas on hilltops (12 sites). The villages had much the same architecture. Most of the houses were single-room with boulder or block foundation and were oriented to plaza areas with one or more truncated pyramids of block tablero-talud construction.

Hamlets show a similar pattern. In Early Palo Blanco, 14 of the 18 hamlets were on hills, while only 9 out of a total of 18 were hilltop in the later part of the phase. Again, Early Palo Blanco hamlets covered greater areas than those of the late part of the phase, but our figures are misleading because many of the

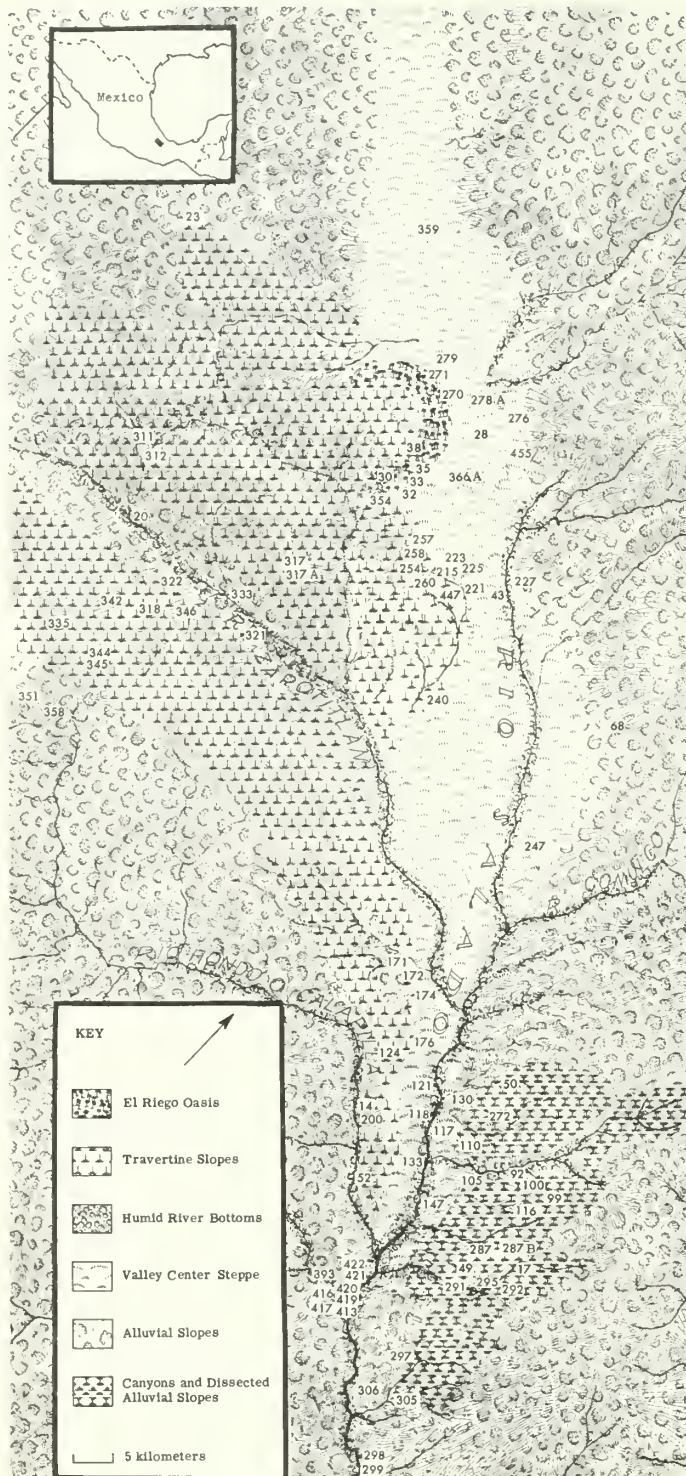


Fig. 173. An ecozone map of numbered Late Palo Blanco sites in the Tehuacan Valley.

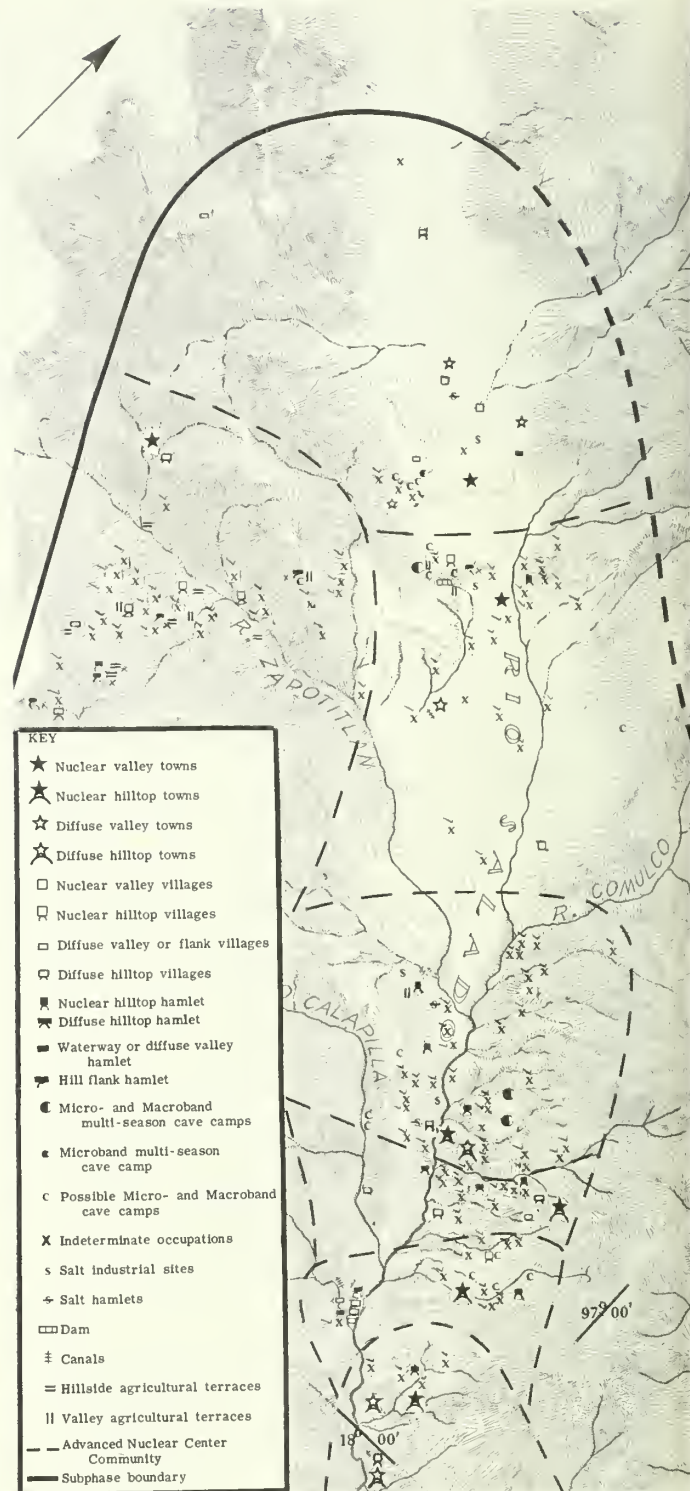


Fig. 174. Map of Late Palo Blanco settlement pattern types in the Tehuacan Valley.

105 Late Palo Blanco undetermined sites may have been hamlets. There were also 25 cave components, 6 salt hamlets, and 6 other specialized sites.

Equally misleading is the overall figure of square meters covered by all habitation sites in each of the two subphases. Early Palo Blanco sites were calculated as covering 6,758,900 square meters while those of Late Palo Blanco covered 3,854,832 square meters. This does not account for the area of the numerous indeterminate Late Palo Blanco sites; nevertheless, it does indicate a relative leveling off, if not a decline, in population during Late Palo Blanco times. That such may have happened is further indicated by the count of houses in the two subphases. In Early Palo Blanco 1,879 single-room houses were counted, 4 multi-room houses, and about 44 small house mounds, while in Late Palo Blanco there were but 1,532 single-room houses, only 24 multi-room houses, and about 145 house mounds, a decline of about 300 habitational rooms. On the basis of these meager indications, we would guess that the Late Palo Blanco population fell somewhere between 15,000 and 25,000 people.

Besides the occupational sites there are a number of specialized sites. Seven of these are represented by amorphous mounds, one of them has a series of canals leading to drying basins, and all seem connected with the production of salt. As was noted in the previous period, these sites are not concentrated and one would suspect they were for the production of salts for the local inhabitants in the surrounding settlements.

Some sites were concerned with water control. Of those without habitation features, three were valley-terracing systems, and two had hillside agricultural terracing. Hillside terracing also occurred in five occupational sites, and valley terracing occurred at three others. This noticeable increase in agricultural terracing strongly suggests that for the first time hillsides were extensively used for dry farming. Damming occurred on two arroyos but neither of the dams was of the magnitude of the earlier Purron Dam. There is, also, at this time the first definite evidence of the use of canals, one (Tr 393) along the side of Xiquila Canyon and the other in the Valley Center at Tr 240. Thus, during Late Palo Blanco times there has been an increase in features indicating water control, but no concomitant increase in populations. Perhaps, even though the population was falling, they were being forced to work new lands for more food.

Seven sites have evidence of quarrying for building blocks and the others are concerned with flint-knapping.

Again in Late Palo Blanco, burial features hold their

obvious implications concerning social status. The simpler burials consisted of one bundle burial in a pit at Tr 322 and the burned bones of four individuals in Zones D and E of El Riego Cave. Of a slightly higher status might be the niche or cist burials that had been looted in Caves Tc 32 and Tc 49, as well as the slab-lined rectangular tombs noted at Tr 287 and Tr 147. On the highest level would be the rather large cruciform tombs found looted at Tr 305, and the similar tomb dug by Noguera at Tr 366 on the outskirts of the town of Tehuacan. As in Early Palo Blanco, these ranked burial features may correlate with a hierarchy of architectural types of Late Palo Blanco that were much the same as those of the earlier subphase.

The clusters of sites, perhaps indicating ancient communities, were slightly different in area and less numerous in number than those of the earlier subphase. Again, however, there is a large northernmost community with a capital or main nucleated town at Tr 366A, inside the present city of Tehuacan. Oriented to this center are three diffuse valley towns, Tr 276, Tr 279, and Tr 354, and perhaps the 5 nearby villages, the salt hamlet, and the hamlet were in turn oriented to these towns. Other occupations of a more temporary nature within this cluster are a single salt site and four cave occupations. Four indeterminate sites, also, probably represent some sort of occupation. Our survey shows that this community represented the northern territorial extension of the Late Palo Blanco Phase. Sherds of this time period found to the north of it seem to be affiliated more with the Teotihuacan-like complex such as occurs at Cholula, while sites to the west with Thin Orange pottery predominant have little if any El Riego Gray or other Palo Blanco types. The eastern border of this community may also be the eastern border of the subphase, for sherds of this period found on the eastern slope of the mountains in Veracruz are predominantly Remojadas types. However, our survey was not complete enough in this area for an exact definition of the subphase's extremity.

For the same reasons, the eastern border of the community directly south may also be considered a border of Late Palo Blanco. Within this community, again, we see a major nuclear valley town, but only a single diffuse valley town, and, oriented to them, two villages, two hamlets, a salt industrial site, 5 cave sites, and about 21 indeterminate sites. In this area we found a single dam, associated with two areas of valley agricultural terracing.

To the west of this zone in the Zapotitlan Valley was another cluster of sites. Its center was a single large nucleated valley town, but we found no diffuse or

secondary towns associated with it. There were, however, in this cluster six villages, four hamlets, a cave site, and twenty indeterminate sites. There were, also, seven sites of hillside terracing and three with valley terracing. We did considerable survey in this area and to the west of it. The western border of this cluster is the western edge of the Palo Blanco Phase. Sites of this time period farther west have predominantly Thin Orange pottery, but within the cluster the sherds are predominantly Palo Blanco types, with few Thin Orange. In fact, the break is so sharp that in discussions during survey we began to see the boundary as political rather than cultural.

Our center valley cluster, extending roughly from the Rio Tilapa to the Rio Comulco, is more like the two adjoining clusters in the same area in the previous subphase. A single nuclear hilltop town was located near a diffuse hilltop town, and around them there was a hilltop village, three hilltop hamlets, two salt industrial sites and two salt hamlets, five cave sites, and a host (31) of indeterminate sites. Just south of this is another community where the site distribution caused it to blend into the one to the north, and only the presence of another nuclear hilltop town justifies separating it. Four villages, three hamlets, and eight indeterminate sites may have been oriented to this town.

The cluster south of Teotitlan del Camino is, however, definitely separate from the others. It has a large nuclear hilltop town, surrounded by a village, a hamlet, four caves, and eight indeterminate sites. Nine sites to the west, at the mouth of the Xiquila River, are probably associated; these include five villages, two hamlets, Tr 393, a long aqueduct, and an indeterminate site.

The cluster at the extreme south end of the area surveyed may include sites in the surrounding terrain we did not enter. This cluster includes a nuclear hilltop town, two dispersed hilltop towns, a village, a hamlet, and four indeterminate sites. Whether this cluster represents the southernmost extension of Late Palo Blanco remains cannot be determined. In part this is true because of our inadequate survey, but it is also because our ceramic study is not refined enough to tell when Late Palo Blanco types end and the Monte Alban types begin. El Riego Gray and other Late Palo Blanco pottery types are much like those of the Oaxaca Valley in Monte Alban Period III, III-IV, and IVa.

On a more general level Late Palo Blanco is much like Early Palo Blanco as to its overall territory, its kinds of settlements, population, kinds of structures

and architecture. The main difference is that fewer of its sites are on hilltop locations, the settlements, and particularly the towns, are less homogeneous in structure arrangement, there are fewer ball courts, the architecture is not as well constructed. Furthermore, we see more evidence of terracing from agriculture in the less fertile regions. Further, the population may have declined. All in all, there seem to be hints that the rigid pattern of the early part of the phase is beginning to change to a more fluid form.

The Survey Sites

Habitational Sites

Tr 240. Tr 240, a diffuse valley town, was located on the mesa just above Altepexi and just southwest of the pumping station. It consisted of about a hundred small nondescript mounds on the valley center, with about fifteen large mounds grouped into at least two, or perhaps three, large plaza areas. These plazas appeared to be rectangular with mounds on all four sides. One of these plazas had a larger mound on its north side with a wall, or causeway, with mounds on it, surrounding a rectangular plaza. There was one possible I-shaped ball court at the side of the mounds; winding through and separating the 100 single-room house foundations and smaller nondescript mounds were the remnants of squared-off irrigated fields, or *apnantlis*. There is also a very good possibility that the small ditches were connected to the main irrigation ditch that flowed down from El Riego near Tehuacan.

Tr 335. This site is situated just southwest of Zapotitlan, on the east flank of Cerro de la Hierba, or Lagunilla, and is characterized by its small agricultural terraces and field borders. It seems to have been a small village with a possible plaza area. Four truncated pyramids were composed of cut-stone blocks. Three of the mounds were small and were not arranged around the plaza, but rather were strung along the edge of the mountain. There were at least three rectangular single-room cut stone block house foundations.

Tr 306. This large hilltop town site is located about four kilometers south of Los Cues, Oaxaca, along the edge of the railroad and the Rio Salado. Features were strung along the top of the slightly-leveled hill and also extended down the sides. The sides of the hill were also terraced for living. There were over twenty-five mounds of large cut slabs; at least eight of these mounds were arranged around the four sides of two rectangular plazas. There is also a possibility that some of these mounds in the main cluster may have been

associated with ball courts. About thirty small foundations of houses were found on the sides of the hills and along the terraces.

Tr 298. This village site is located about 2 km. north of Tecomavaca, just east of the highway leading into town, and east of where the railroad and the river run side by side. The site is located on the top of a rather steep hill, and only covers a small area. In the center of this flattened hilltop was a single large rectangular ball court, or sunken plaza, surrounded by a continuous circle of mounds, with one to the east slightly larger than the others. Fifteen small house foundations were outlined by boulders.

Tr 299. This town site is located just north of the bridge, north of the town of Tecomavaca, on a large hill to the east of the highway. The hill is roughly rectangular and has four large projections at the corners like the arms of a great cross.

Our survey of the site was brief, but at least six widely separated plaza areas were located. Two northwestern plaza areas were surrounded by rectangular mounds on all four sides of the rectangular plazas. A third plaza on the southwest spur was surrounded by six mounds or very large, raised, house platforms. Also, just northeast of this was another plaza surrounded by house platforms. Between this plaza and one surrounded by four mounds was a low depression that might represent an I-shaped ball court. On the beginning of the northeast spur, about seven low mounds or foundations formed another plaza. On the northeasternmost tip of this spur a sunken plaza had three long rectangular mounds on the north, west, and south sides, while on the east side, there is a large, seemingly conical, mound. These last two mound groups also showed stucco on the floor of the mounds, in a few cases painted red and white. Besides the large mound groups, there were perhaps 150 rectangular single-room house platforms outlined by boulders. Besides these features, along the borders of part of the hill, there were some raised eminences—long ridges—as well as a large number of boulders. We have interpreted this as being a terrace, rather than an actual fortification.

Tr 110. This is another hilltop town located just north of Aldama in the general region of the Tilapa drainage. The site was situated on a large hill directly east of the railroad tracks and the Rio Salado. On top of the hill there were at least 12 large mounds made of dry slab or block masonry, and, though the area was covered by thick brush, these mounds seemed to be ar-

ranged around the four sides of at least three separate rectangular plazas. Beside these features, there were between 100 and 150 single-room boulder house foundations both on the top of the hill and on the terraced flanks.

Tr 417. *Tr 417* is located to the south of the valley of Tehuacan on the north rim of the Rio Xiquila Canyon, about 1 km. upstream from its confluence with the Rio Salado, approximately 6.4 km. west of San Juan Los Cues and 9.1 km. southwest of Teotitlan del Camino. The hamlet site is situated on the west end of a small long hill, about 35 m. above and 250 m. north of the Rio Xiquila. The south edge, as well as the southwest and southeast corners, of the hill was bordered by natural outcroppings of bedrock, while to the northwest and northeast, the prehistoric inhabitants outlined the 20 by 50 m. area of the site with low terracing walls of unmodified slab and boulders. Probably following the natural slope of the hilltop, the site is divided into two areas of different elevation, but of approximately the same size. The east half of the site is about 1 m. higher than the west half, the division being rather sharply marked by two long, high steps, formed by two parallel terracing walls. At least two, and possibly three, of these foundations, as well as a small 40 x 40 cm. stone slab-lined bin or cist, were found on the west half of *Tr 417*, while the remaining two foundations were located along the west edge of the higher east half of the site.

Tr 133. Located in the southwest quadrant of the valley, this small hamlet site is about 4.2 km. southwest of San José Tilapa, and 1.3 km. north-northwest of San Antonio Nanahuatipan. It is situated on an elliptically-shaped northeast by southwest oriented hill, on the west bank of the Rio Salado, some 300 m. southwest of its confluence with the Rio Tilapa. Twelve single-room house foundations had been constructed on the artificially-terraced summit in the southwest flank of the hill. The foundations, as well as the terracing walls, were made of unmodified blocks in slightly-shaped boulders. Four of the foundations were located on the summit around a rectangular plaza or patio area. Four more such small foundations were in a similar arrangement around a plaza or patio in the first terrace southwest of the summit. The remaining two to four foundations were located still farther southwest on the lower terrace or slopes of the hill. It does not seem that this relatively regular arrangement of mounds was for the purpose of making ceremonial plazas, however; rather, just a neat arrangement of this small hamlet.

Tr 100. This village site, some 300 m. west of the Rio Tilapa and about 3 to 5 km. south of the town of San José Tilapa, is near a small hill called Cerro de San José. The entire hilltop was covered by about a hundred single-room house foundations of block boulders, some of which may have been crudely cut. These houses were strung along various terraced areas, the terraces being made of flat slab foundations. There was some leveling-off of the north part of the hill to form an acropolis-like area; this portion of the hill had stone walls, or stone terraces, around its edge, as well as a large pile of stone that once might have been a mound.

Tr 227. *Tr 227* is located in the northeast portion of the Tehuacan Valley, about 4.7 km. north-northeast of the village of San Marcos, 3.7 km. east-southeast of Tehuacan, and 800 m. east of the village of San Diego Chalma. The hamlet is situated on the summit as well as on the south and southeast flanks of a north-south oriented, elliptically-shaped, hill. Although the summit did not appear to have been modified, three large terraces outlined with retaining walls or boulders were constructed along the south and southeast flanks of the hill, and there were the remains of seven boulder-founded structures.

Tr 92. This small hamlet is situated in the area of Tilapa, about 1 km. east of town. It was on the top and sides of a small hill, and only covered an area from about 60 m. long to 50 m. wide. It had been badly looted, and, while we could see the remains of terraces along the side, there was no evidence of house foundations or mounds that we could easily determine.

Tr 176. *Tr 176* is located in the southwest portion of the Tehuacan Valley, 3 km. southwest of Pueblo Nuevo, and 3.4 km. southeast of Axusco. Situated on a small east-west oriented low hill, this hamlet site had a total of six single-room boulder-outlined house foundations.

Tr 333. This village is located to the west of the Tehuacan Valley, in the northeast quadrant of the Zapotitlan Valley. It is situated atop a small, roughly circular, hill, approximately 1 km. east-northeast of Zapotitlan Salinas, and 800 m. north of Miahualtepec. The site consisted of two small mounds and twenty single-room house foundations of boulder or crudely-cut blocks.

Tr 271. This village site is in the north part of the Tehuacan Valley, about 5 km. north-northwest of San Lorenzo near the hacienda Rancho Grande. There was one large earth and stone mound in its center that en-

compassed about half of the site area. Modern plowing may have destroyed any house foundations that surrounded this single badly-destroyed mound.

Ts 455. This open site, a diffuse valley hamlet, recognized by an area of sherds and wattle-and-daub, was situated about 2 km. north-northwest of Tehuacan, about 200 m. north of the Tehuacan-Puebla highway, in between the Tehuacan airstrip and the highway to Vera Cruz.

Tr 287. This village site is situated on the first hill to the south-southwest of Cerro Tehuehue, and about 2 km. south of Teotitlan del Camino. The sides of the hill had been terraced, and on these terraces, as well as on a small part of the top of the hill, there were about 20 single-room house foundations. On the top of the hill were also at least two large mounds, about 5 m. by 10 m. Here, also, were found the remains of rectangular tombs, made by setting upright calcite slabs. These tombs were about 1 m. wide and 2 m. long. A very small shelter in one of the terraces on the east side of the hill contained some pictographs, seemingly of animals; three figures looked like animal or dog skins that had been stretched out to dry. Two hands outlined in red were depicted nearby.

Tr 225. *Tr 225* is in the north-central portion of the Tehuacan Valley, approximately 5.3 km. south-southeast of Tehuacan, and 2 km. northwest of the village of San Marcos. The remnants of at least 10 rectangular single-room foundations of stone blocks and boulders were found widely dispersed over the southeastern flank of this northwest-southeast oriented, elliptically-shaped, hill.

Tr 117. This large hilltop town was situated to the northwest of Aldama, just east of the Rio Salado, and south of the railroad tracks. It is only about 500 m. north-northwest of Aldama itself. The hill is a long, low one, ending in high bluffs with about 200 house foundations on the hill and along its terraced sides. These house foundations were all outlined by crude slabs and boulders, and were of the single-room type. Besides these living features, there were about 12 mounds, 8 of which were quite small in size and were situated around three possible plazas. These surrounded a larger plaza with four large mounds around it.

Tr 43. This hilltop site in the municipio of Tehuacan is situated about 2 km. east of Trinidad and 3 to 4 km. west of El Molino, on the road from El Molino to Trinidad. There were some terraces along the side of the

hill, and on these terraces, and on the top of the hill, there were about 30 single-room house foundations outlined by stone blocks or slabs. On top of the hill was a very large pyramid. Nested against it was at least one I-shaped ball court, and off on the southern flanks of the hill, in among the various platforms, were at least two other plazas. One of these plazas was surrounded by only two mounds, while the other plaza was rectangular with one mound on each of its four sides.

Tr 99. This nuclear hilltop town is only about 50 m. south of the Rio Tilapa and about 1 km. northwest of the town of San José Tilapa. The fifty or so house foundations were mainly found on the plain and were of the small, single-room type, surrounded by crudely-cut blackish stone boulders. There were, however, about 30 on the flank of the terraced hill. The mounds, six in number, were mainly on the top of the hill, and seemed to compose at least two interconnected plazas. They were all made of cut, dry-laid slabs or blocks. The rectangular plaza, with four mounds on all sides, had one mound on the north side, which was an extremely large one. The other mounds nearby were of much smaller dimensions. The other plaza, also on the south end of the hill, had two long rectangular mounds on either side and opened to the east and to the west.

Tr 147. Discovered in the southwest part of the Tehuacan Valley, village site Tr 147 is located about 5.6 km. west of Teotitlan del Camino, and 500 m. south-east of San Antonio Nanahuatipan. It is situated on the summit and on two boulder-outlined terraces of a small, low (about 10 m. high), elliptically-shaped hill, oriented in a southwest-northeast direction. The majority of the architectural construction recorded was found on the summit. A very large, U-shaped mound of earth and rubble open to the south was located in the center of the northeast half of the summit. The other earth platform was located in the southeast portion of the northwest half of the summit; it had at least one boulder-outlined single-room house foundation and three double-room house foundations. On the terraced hilltop to the southwest of this platform, as well as on the terraced hillside, were the outlines of other (possibly single-room) house foundations. There were also house foundations on the terraced northeast summit, and a pit revealed rectangular stucco-covered cists, possibly tombs. (See Fig. 175.)

Tr 305. This nuclear hilltop town is situated about 1.4 km. southeast on the second largest hill south of Los Cues, to the east of the highway leading south from

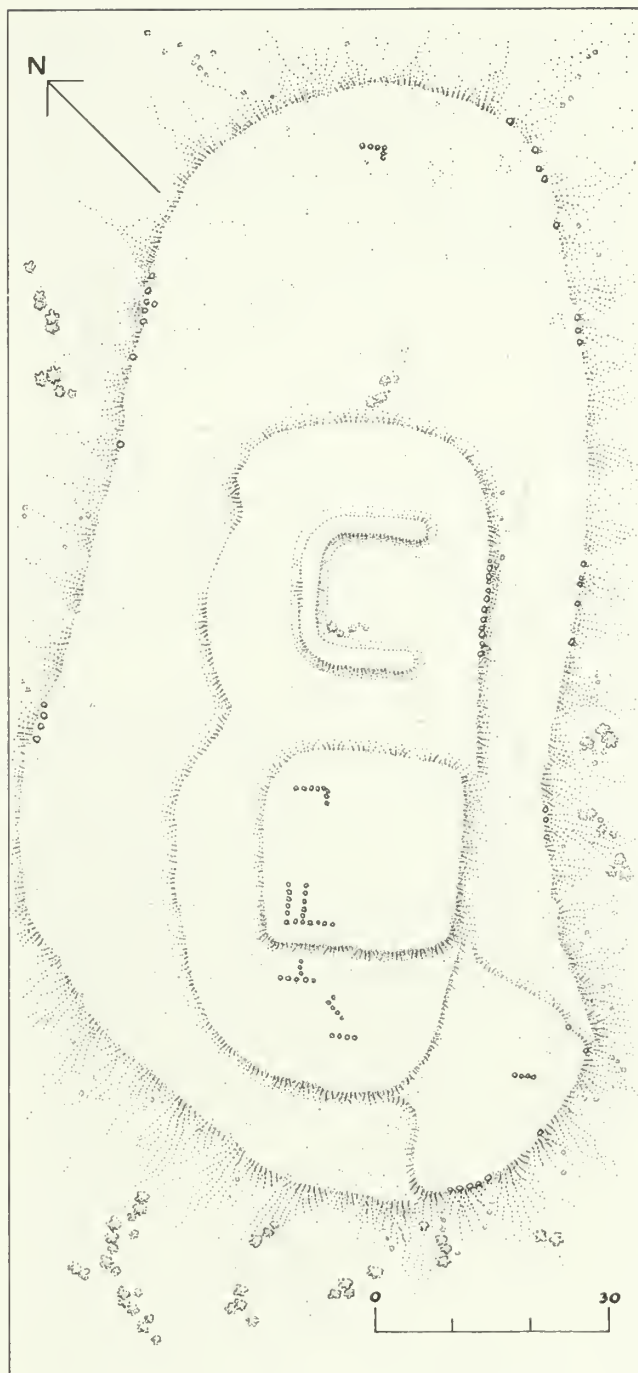


Fig. 175. Sketch map of Tr 147, dispersed hilltop village.

Los Cues to Tecomavaca. The top of this huge hill had been flattened and terraced, and there were terraces on the steep sides as well. On these terraces and on the top of the hill were the remains of about 50 foundations outlined by boulders. Besides these features, and

mainly on the top of the hill and nested together, were about 20 mounds made of boulders. Though it is extremely difficult to tell, because the site has been badly looted, these mounds seemed to surround at least five plaza areas at slightly different elevations, each having mounds on all four sides. Some of the mounds showed evidence of stucco floors. Two of the mounds had what seemed to be the remains of large cruciform tombs. These had thin, slab, dry-laid masonry walls, but do not seem to have had huge stone roofing material over them. Again, the tombs had been looted.

Tr 247. This is a single mound on the plains with painted stucco floors, about 50 m. east of the road from Zinacatepec to Calipan. This nuclear valley village is about 1 km. northeast of the Sierra San Pedro, and about ½ km. before the road from Zinacatepec bends at a sharp right angle to go over the bridge to Calipan. The area of sherds around the mound was quite small.

Tr 322. *Tr 322* is a nuclear hilltop village centrally located in the Zapotitlan Valley to the west of the valley of Tehuacan, approximately 8.7 km. south-southeast of Santa Ana Teloxtoc, and 5.5 km. west-southwest of Zapotitlan Salinas. The habitation zone was situated on a small, northeast-southwest oriented, elliptically-shaped hill. Also found were 30 to 40 linear border agricultural terraces constructed across a moderately sloping, U-shaped area to the south and southeast of the hill. A large, single mound and 15 to 20 cut-stone-block single-room foundations were situated on the hilltop. These were surrounded by vast quantities of chipping debris, indicating it was also a quarry site.

Tr 420. This village site is located south of the Tehuacan Valley, approximately 5.6 km. west of San Juan Los Cues, Oaxaca, and 8.8 km. south-southwest of Teotitlan del Camino, on the west bank of the Rio Salado, about 300 m. north of its confluence with the Rio Xiquila. The site overlooks site *Tr 421*, which is just below the promontory on a lower terrace in the Rio Salado, about 100 m. to the east. The eastern habitation area was characterized architecturally by a small platform mound, upon the summit of which was constructed a building foundation; from 5 to 8 foundations of small-block construction, rectangular structures, were on the south and west edges of the terrace.

Tr 413. This village site is located south of the valley on the north rim of Rio Xiquila Canyon, about 200 m. upstream from its confluence with the Rio Salado, about 5.7 km. west of San Juan Los Cues, Oaxaca, and

9.2 km. southeast of Teotitlan del Camino. The site is situated on the summit of a terrace, some 10 m. lower in elevation than the aqueduct along the canyon wall at its eastern extreme, and above the older aqueduct along the river's edge.

A small platform mound with a single-room house foundation on top of it was located on the projecting, east end of the terrace. This proved to be the site's predominant architectural feature. A few meters west of the platform mound, the natural terraces rise in two steppe-like artificial terraces. On these terraces were about 10 single-room house foundations made of roughly-cut boulders.

Tr 422. This hamlet is another part of the Rio Xiquila complex. It is an open site on the lower hill slopes, about 250 m. to the west of the Rio Salado and 300 meters north of the Xiquila. The aqueduct probably reached this site, although no fragment of it was found. The site contained about 20 small single-room rectangular foundations composed of modified slabs and cut blocks of stone.

Tr 312. This village site is located to the west of the Tehuacan Valley in the north-central reaches of the Zapotitlan Valley, some 3 km. south-southeast of the town of Santa Ana Teloxtoc and 10 km. west-northwest of Zapotitlan Salinas. It is situated on a terrace above a dry barranca and has a single mound surrounded by 15 to 20 single-room house foundations.

Tr 276. This diffuse valley town site called Tepeyotla on the plains about 400 m. west of Santiago Miahuatlan and 2 km. east of the Tehuacan-Veracruz highway contained four mounds north of two small mounds facing each other. The north group had four long mounds around a rectangular plaza with two small parallel mounds east of them forming one or two more plazas, open to the north and south.

Tr 279. This diffuse valley town is on the plains about 200 m. east of Madero, just north of the town of Tehuacan, about 50 to 60 m. away from the road. In fact, most of the site is in the present Madero graveyard. It contains about 10 to 12 mounds, which seem to be mainly made out of earth, and, though badly destroyed, may be associated with a couple of plaza areas on either side of the highway. There are, also, a number of badly destroyed rectangular house foundations, all of them of the single-room variety.

Tr 311. This nuclear valley town is situated about 4.5 km. south-southeast of Santa Ana Teloxtoc. It is on the flat terrace above the river plain, covering an area

TABLE 34
Late Palo Blanco Settlement Pattern Data

	Tr 240	Tr 335	Tr 306	Tr 298	Tr 299	northeast	north central	northwest	south	Tr 110	north plaza	central plaza	south plaza	Tr 417	Tr 133	Tr 100	Tr 227	Tr 92	Tr 176	Tr 333	Tr 271	Tr 455	Tr 287	Tr 225	Tr 117	south	central	north	Tr 43	north	central	south	Tr 99	hill	valley	valley	Tr 147	Tr 305	Tr 247	Tr 322	Tr 420	Tr 413	Tr 422	
MICRO-ENVIRONMENTS																																												
Travertine Slopes																																												
arroyo flanks																																												
slopes																																												
hill flanks			X																X	X					X																			
hilltops																																												
Valley Center Steppe																																												
humid river flanks	X									X					X						X	X																						
steppes																																												
hilltops			X																							X																		
Alluvial Slopes																																												
arroyo flanks																																												
hilltops					X									X			X																				X	?			X			
Canyons and Dissected Alluvial Slopes																																												
canyon flanks																X																												
hilltops																		X						X										X										
COMPONENT DIMENSIONS																																												
length in meters	1,000	100	300	60	400					300				50	100	150	50	60	40	125	50	50	200	50	300								300				160	500	30	200	120	150	150	
width in meters	1,000	100	25	40	400					300				20	50	20	50	30	125	50	50	100	50	200								300			300			35	100	30	100	80	100	80
extent in sq. meters	1,000,000	10,000	7,500	2,400	16,000					90,000				1,000	5,000	3,000	2,500	3,000	1,200	16,625	2,500	2,500	20,000	2,500	60,000							90,000			30,000			5,800	50,000	900	20,000	9,600	15,000	12,000
SETTLEMENT FEATURES																																												
rectangular cists														3																														
multi-room houses (block or boulder masonry)																																												
2-room																																												
single-room (slab masonry)														3																														
length in meters														4																														
width in meters														2																														
single-room (block masonry)			3	30												12	100	7	X	6			?	20		100				30						20	20	30	15		20	8	10	20
length in meters			4	5													4	4					4													4		4	5	4	4	4	4	
width in meters			2	3													2	2					2												2		2		3	2	2	2	2	
single-room (boulder masonry)	100													3											10																			
length in meters	4													4												100																		
width in meters	2													2												5																		
small mounds or pyramids			3	17																																								
length in meters			8																																									
width in meters			3																																									
painted stucco																																												
stepped pyramids																																												
length in meters																																												
width in meters																																												
pyramids or large mounds (boulder block)	15	1	1	8	1											1																												
length in meters	10	28	20		30					30																																		
width in meters	4	10			20					20																																		
height in meters	2	3			4					4																																		
axis			NS																																									
painted stucco																																												
causeway structures		1			?					3																																		
plazas	2	1	?	2	?					1	1	1	?	?	?																													
U-shaped	2																																											
parallel																																												
enclosed		1		?																																								
plaza terraces				X																																								
hillside terraces				X																																								
ball courts				X																																								
l-shaped	1			?																																								
length in meters																																												
width in meters					20																																							
rectangular					5																																							

Table 34 continued on reverse side

Table 34 (continued)

about 350 m. by 350 m. A few of what may have been single-room house foundations outlined by boulders were noted, but the main features of the site were about 18 mounds. Most of these mounds were made of dry-laid slab masonry, but a number of them had surfaces covered with stucco, which had been painted red and white. There seemed to have been at least two main plaza areas. One is rectangular. On its east side there are two small pyramids; on its west side, a long pyramid about 10 m. in length; on its south side, a long earth mound with an extension to the south forms the north and west sides of a second plaza. On the north side of the first plaza is what appears to be a large conical pyramid, but it has been so badly destroyed that one cannot really tell what its original outline may have been. A low parallel mound abutting the west side that might represent the west wall of a ball court or of a large pyramid is next to the plaza. North of this area is another apparent plaza, which has four rectangular mounds surrounding its four sides.

Tr 292. This is a hilltop hamlet situated about 2 km. south of San Martín Toxpala, south of Teotitlan del Camino. The hill is an extremely long, narrow ridge, about 800 m. in length, and about 40 m. wide and has approximately 60 single-room house foundations on it.

Tr 359. Site Tr 359 is located in the northernmost portion of the Tehuacan Valley. The Tehuacan-Puebla highway passes through the site at about Km. 227.1, about 1 km. north of the town of San Andrés Cacaloapan. This diffuse village is situated on a large hilltop. The architecture consists of from 12 to 14 platform or house mounds constructed of black earth and limestone rubble, with crudely-cut limestone block foundations. Most of these are small, but the two southernmost ones are larger and possibly were ceremonial pyramids.

Tr 105. This site is approximately 2.9 km. northeast of San Antonio Nanahuatipan, and 1.5 km. southwest of San José Tilapa in the south-central section of the Tehuacan Valley. The hamlet is situated on the flat summit of an elliptically-shaped northeast-southwest oriented hill, about 500 m. southwest of Rio Tilapa, and has about 15 building foundations of the single-room type, made of unmodified basalt or river boulders.

Tr 345. This hamlet site, located in the south end of the Zapotitlan Valley, is just off the road 37.4 km. south from Tehuacan. It was strung out along the side of a mountain site, and on some of the artificial terraces were about five small single-room house foundations made of large, cut slabs and boulders.

Tr 351. This site, called "Cruz del Tetel," was located 1.5 km. south-southwest of Acatepec east of the Cerro del Calvario, southwest of the Zapotitlan Valley. The hamlet itself is situated on a relatively flat plain at the foot of the hill, and consists of three or four extremely small mounds of stone rubble and slabs.

Tr 416. This diffuse village site situated on a high rectangular terrace is on the north side of Xiquila Canyon about 800 m. west of its confluence with the Rio Salado, about 6.3 km. west of Los Cues. The most prominent features of the village are two parallel truncated pyramids along the south side of the terrace overlooking the river. Around the other three sides of the terrace are about eight rectangular boulder-outlined single-room house foundations; three to the west and north, and two to the east. There were also about a dozen more, on a small hill just to the west of this plaza or terrace. The Xiquila Aqueduct (Tr 393) flows around the west, north, and east sides of the plaza on its way to the Rio Salado.

Tr 318. This hamlet site is located on the flanks of a hill in the Zapotitlan Valley, 11.2 km. south-southeast of Santa Ana Teloxtoc. It consists of a series (8) of linear field borders, with cheek dams and four or five single-room stone-block house foundations interspersed among the eight leveled, agricultural-terraced fields. Around the house foundations were large quantities of flint, indicating that the site also served as a chipping station.

Tr 52. This dispersed village, cut through by the east bank of the Rio Calapilla, is situated about one-half mile south of the point where the road from Ignacio Mejia enters the canyon. The site consists of 8 small earth mounds with plaster on their tops, and, occasionally, a river boulder on their sides. These mounds seem to be clustered around at least three widely-separated rectangular plazas. Beside the 8 mounds, there are many house foundations present on the site. All these house foundations appear to be of the single-room variety and are outlined by boulders.

Tr 421. This diffuse village site is situated on the west bank of the Rio Salado, about 300 m. north of its confluence with the Rio Xiquila. It is an open site on the terrace just below and southeast of Tr 420, overlooking the Rio Salado. The Xiquila Aqueduct, Tr 393, passes through the site. Its architectural features consist of one small, stone-faced pyramid, located in the northeast corner of the site, and about 10 small rectangular house foundations of modified stone slab and

blocks, located in two parallel lines on either side of the section of the aqueduct.

Tr 419. Overlooking *Tr 421*, about 50 m. southwest on a leveled boulder-outlined promontory, was a small pyramid surrounded by about 15 single-room house foundations. The aqueduct runs between it and *Tr 421*. Whether this village site, *Tr 421*, and *Tr 420* are separate sites or one large village is difficult to determine.

Tr 38. This village site is situated on top of the mesa west of San Lorenzo, about 600 m. from the top of the barranca. On this flat plain there are two enormous facing mounds, made of large, uncut, limestone slabs. Collection around the site indicated that there probably had been house foundations which had been disturbed by recent agricultural activities.

Tr 116. About 600 m. northwest of Teotitlan del Camino, on the last hill on the south side of the highway, was a small village site. It was represented by three small mounds of rock (pyramids) on the hilltop surrounded by many (50) single-room house foundations located both on the hilltop and on the terraced sides of the hill.

Tr 344. This hamlet is situated on the flanks of a hill about 500 m. northeast of the highway from Tehuacan to Huahuapan, at approximately Km. 37.2, 5 km. southwest of Zapotitlan Salinas. The whole side of this hill has been heavily terraced by slab masonry. On these terraces are about 10 single-room, and 10 multi-room, house foundations. An interesting feature is that about half these house foundations have flagstone paving and are outlined by boulders. Also present in one of the houses were three bundle burials in three large vessels.

Tr 23. *Tr 23*, our northernmost site of the late Palo Blanco times, was located about 6 km. west of Tlaco-tepec near the town of Zoyamazalco. The village site is situated in the middle of the plain and covers an area about 50 m. by 400 m. A central portion of a line of seven mounds has three larger mounds fairly close together.

Tr 118. *Tr 118* is located in the southwest part of the Tehuacan Valley, approximately 1.1 km. southwest of the village of San Rafael, 5 km. west-northwest of San José Tilapa, and 4.8 km. north-northwest of San Antonio Nanahuatipan. The ruins of the village ranged from 50 to 150 m. west of the Rio Salado and are situated on the summit of a small hill, as well as on the valley floor to the south of the hill. Only two stepped

or truncated platform mounds were found atop the elliptically-shaped east-west oriented hills, while some 40 single-room house foundations were seen on the valley floor. There also were some salt mounds and sherds of the salt industry nearby.

Tr 342. *Tr 342* was discovered west of the Tehuacan Valley in the southwest part of the Zapotitlan Valley, some 10.2 km. south-southeast of Santa Ana Teloxtoc, and 8.7 km. west-southwest of Zapotitlan itself. This nuclear village is located on the top of the second of three small hills, aligned northeast-southwest on the lower northwest flank of the Sierra de la Hierba, known locally, and on our Papalohuapan maps, as the Cerro Lagunilla.

A single mound of earth and rubble with a facing of cut stone, and several stucco floors, were the only architectural features noted on the site. However, all the sides of this hill had been converted into a series of long, broad agricultural terraces, by the construction of linear field borders and high retaining walls.

Tr 291. *Tr 291* is located just south of the Tehuacan Valley in the state of Oaxaca, about 3 km. southwest of San Martín Toxpala and 1.2 km. southeast of the Ingenio de Ayotla. Portions of this nuclear town are situated on a series of low, east-west oriented hills, about 200 to 300 m. west of the Rio de San Martín, also known as the Rio de los Reyes. The southeasternmost hill had on its east end two long, east-west, parallel-facing mounds, forming a plaza, with an I-shaped ball court nested against the east edge of the northern mound. Next to it, in the central part of the hill, was another pair of long mounds, similarly oriented, and forming a plaza. On the south end were three square pyramids around a plaza opening to the east and the middle plaza area. The hill to the southwest of the group had about 10 single-room house foundations while the northwest hill had 30 single-room foundations and about 10 multi-room foundations, and the northeast hill had over 40 small mounds or house foundations on it.

Tr 354. Site *Tr 354* is located in the northwest portion of the Tehuacan Valley, about 3.7 km. west-northwest of the village of Coapan and 4.5 km. west-southwest of Tehuacan. It is oriented north-south on a large, natural terrace, overlooking the valley floor. The most prominent architectural feature of this diffuse valley town is a large east-west oriented plaza, located near the southern edge of the site, which is bordered on all four sides by a mound of cobbles and boulders (causeway) about 8 m. wide and 1.5 m. high. On three cor-

ners of the plaza, the course of this wall-like mound is interrupted by three small pyramids. A fourth platform mound was probably once located at the northeastern corner, as well, but now a modern road passes directly over the spot, and all surface traces of the wall-like mound, as well as any other architectural features, have been obliterated. At the southeast end of the plaza, a terracing wall rises 1 m. to the floor level of another small plaza. A few meters north of the walled plaza is a north-south oriented I-shaped ball court. Measuring approximately 8 m. in width and 40 m. in length at the level of the floor, this court was apparently constructed of earth and rubble faced with boulders. Some 10 m. west of the north end of the ball court is a small platform mound, badly disturbed by looters and those seeking stones for construction.

A 10 by 10 m. plaza surrounded by a 1 m. high and 6 m. wide mound or causeway of boulders was the next structure noted along the northeast corner of the ball court. Ten meters northeast of this second plaza was a long, narrow, north-south oriented mound, and 40 m. due east of the center of the long mound just described, was a small, rectangular, north-south oriented mound, constructed of earth and rubble.

The remains of at least 10 single-room house foundations of boulders in slightly-shaped limestone blocks were found, apparently at random, around the larger structures. (See Fig. 176.)

Tr 287A. This site is represented by an area of Late Palo Blanco sherds, just west of *Tr 278* mound and the canal to the east. The village site is situated on the plains just north of Tehuacan and east of Madero on the Puebla highway. It has 2 large mounds.

Tr 172. This site is located on the valley slopes about 1.5 km. southwest of Axusco, and consists of about 15 single-room house foundations. In the arroyo just north of the site are two check dams. The hilltop hamlet was probably connected with the salt industrial site, *Tr 171*, to the north, and the salt hamlet *Tr 174* to the south.

Tr 297. This hamlet is about half a kilometer north of Los Cues, just west of the highway to Teotitlan del Camino. It is on a small east-west oriented hill that had had its top leveled, and had been terraced. There are no large mounds associated with this site, but there are a great deal of flat slabs or blocks of cut rock distributed over the top of the hill. These, we think, may have been slabs for the floorings or walls of house foundations.

Tr 130. This hamlet is situated about 1 km. directly

northeast of San Rafael. It is only about 900 m. east of the Coxcatlan-Teotitlan highway. The site is situated on a small hilltop and extends down the sides of this hill. The sides of the hill are terraced and the top contains about 30 single-room, cut-boulder, house foundations.

Tr 358. This is the westernmost Late Palo Blanco component, situated on a small hill, Cerro Cotuzinchi, about 1 km. south of Acatepec and 700 m. northwest of the Rio Acatepec. This diffuse village has on its summit a single large mound with stucco floors and about 20 single-room, stone-block, house foundations, all badly destroyed.

Tr 223. On the flanks of a hill, Cerro Yautepec, about 250 meters west of San Marcos, were about 40 to 50 hillside terraces with as many single-room house foundations, making up this nuclear village. On the badly-disturbed summit of the hill, there were more house foundations, as well as about 7 small and 3 large stone mounds not associated with any sort of discernible plaza.

Tr 366A. This is the site of the cruciform-shaped tombs that Noguera excavated in June of 1937 in the western limit of the town of Tehuacan. (See Fig. 177.) His sherd counts from his tests indicate that the occupation also extended over the Late Formative mounds of *Tr 366* previously described.

Tr 317 is described above.

Cave Sites

Tc 272, Zone C, Zone B north, Zone B south, and Zone A are described in Chapter 3.

Tc 50, Zone V, Activity Areas A and B, and Zone IV are described in Chapter 6.

Tc 254, Zone C¹ and Zone B are described in Chapter 4.

Tc 35, Zone E-F and Zone D are described in Chapter 2.

Tc 255, Zone B, is described in Chapter 4.

Tc 295. These are several terraced shelters on the flank of a hill, west of the highway to Los Cues, about 800 m. from Cerro Amatepec, south of Teotitlan del Camino, in the municipio of San Martín Toxpala. The site is located at the junction of the road where a footpath leads to the small town of Ayotla. The five shelters, three of which have terraces of river boulders in front of them, are all quite small.

Tc 200. This rock shelter was discovered in the southwest quarter of the valley of Tehuacan, some 8.7 km. south-southeast of Axusco, and 5.2 km. northwest of San Antonio Nanahuatipan. Tc 200 is situated in the light gray strata on the southwest flanks of the Cerro Prieto, about 1.4 km. northeast of the point where the road from Axusco reaches the floor of the Rio Calapilla Canyon.

Tc 49. This cave is located in the extreme southeast portion of the Tehuacan Valley, about 1.5 km. northwest of the Ingenio de Ayotla, and 2 km. west of San Martín Toxpala. It is situated in the cliff forming the eastern wall of the Coatepec Canyon, about 40 m. above the canyon floor. The side walls of the five burial chambers were still standing when the cave was discovered, but the front wall, as well as the tomb contents, had been almost completely destroyed by looters. All of the remaining masonry walls were made of nicely-shaped stone blocks set in mortar.

Tc 260. This site was situated in San Marcos Canyon, about 300 m. downstream from the shelter, Tc 254, where the canyon widens into the main valley. In front of the cave, there are a number of field borders which may have been fed by the canal and dam in that area.

Tc 32. This is a small cave facing south in the El Riego complex—the small, narrow arroyo on the south side of the El Riego cliffs at its westernmost extremities—in the Barranca de los Coyotes west-southwest of Tehuacan. Human bones in the talus indicate there may have been a tomb in it.

Tc 33. This is another cave in the El Riego cliffs, about 150 m. to the west of the excavated site, Tc 35. The southward facing mouth of the cave has a line of cut stones. The cave has been badly looted.

Tc 14. This is a long, narrow shelter on the northeast bank of the Rio Calapilla about 200 meters north of the entrance of the road from Axusco. In the southeast end of the cave are walls of cut stone.

Tc 17. This small rock shelter was situated south of San Martín Toxpala and north of the point where the highway crosses the Rio de los Reyes. Located in a small cliff only about 150 m. north of the Rio de los Reyes, it can be seen from the road.

Tc 257. This cave is located in San Marcos Canyon on the east side of the right fork of the Tecorral Canyon about 2 km. above our excavated site, Tc 254. It was tested by MacNeish and Cook on December 24, 1962,

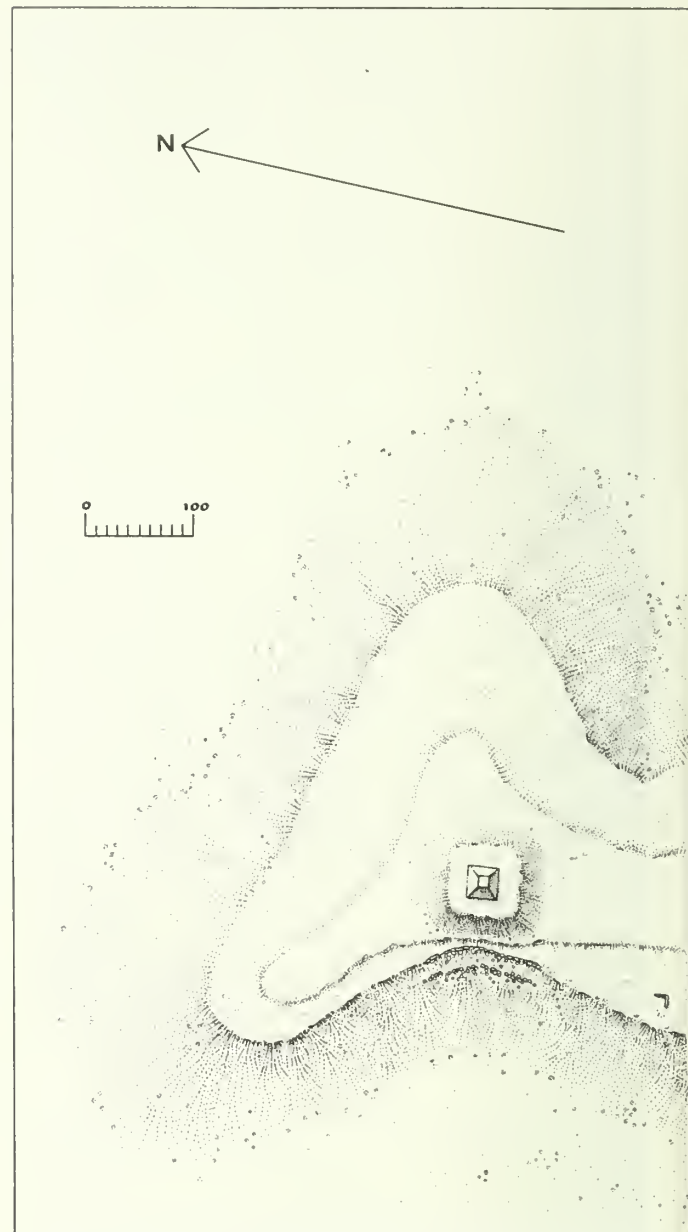


Fig. 176. Sketch map of Tr 354, a Late Palo Blanco dif-fused valley town.

and was discovered to contain some preservation and Late Palo Blanco remains.

Tc 30. This site is situated high in the El Riego cliffs about 800 m. south of the town of San Lorenzo.

Tc 68. This site was located 3 to 4 km. on a straight line west of the town of Ajalpan on the western edge of the Cerro Colorado de Ajalpan. It is a very small cave situated in the middle of an erosional cliff about

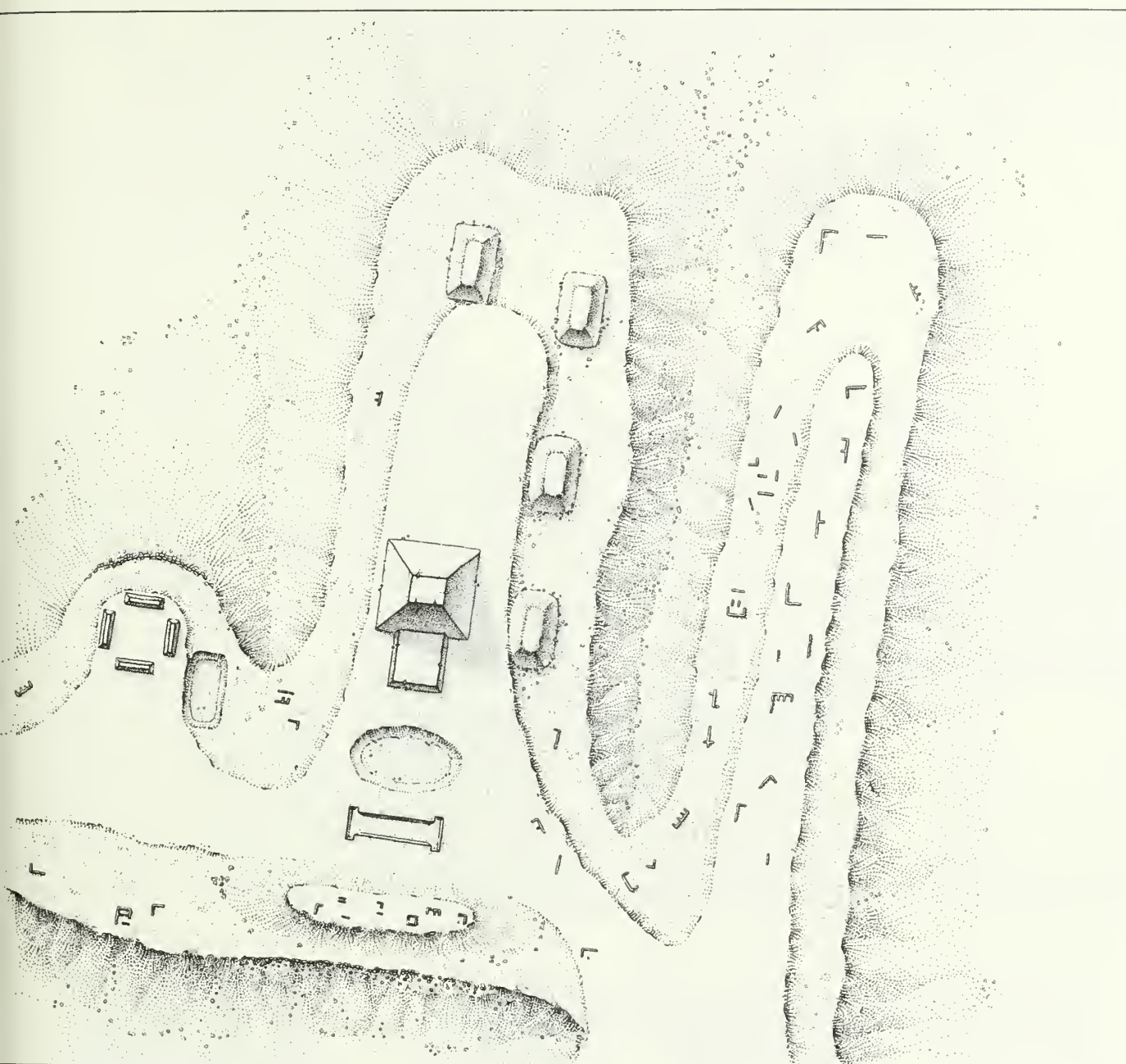


fig. 176 continued)

30 m. up from the talus below. Modern xantil figurines and burned and recently blood-soaked bark cloth were found in it, indicating that this cave is still in use. Candles were found in front of the xantiles, as well as sprigs of amaranth.

Tc 124. *Tc 124* is located in the southwest section of the Tehuacan Valley, some 4.6 km. south of Axusco, 6.2 km. west-northwest of the village of San Rafael,

and 9.4 km. west of San Antonio. This rock shelter is situated just below the summit in the southeast face of the Cerro Tepetroje, opens toward the east and has in it a series of narrow, steppe-like terraces, bordered by low walls of unmodified boulders and slightly shaped blocks of stone.

Tc 215. This is a small shelter high in the cliff of the first canyon northwest of San Marcos. It faces south-

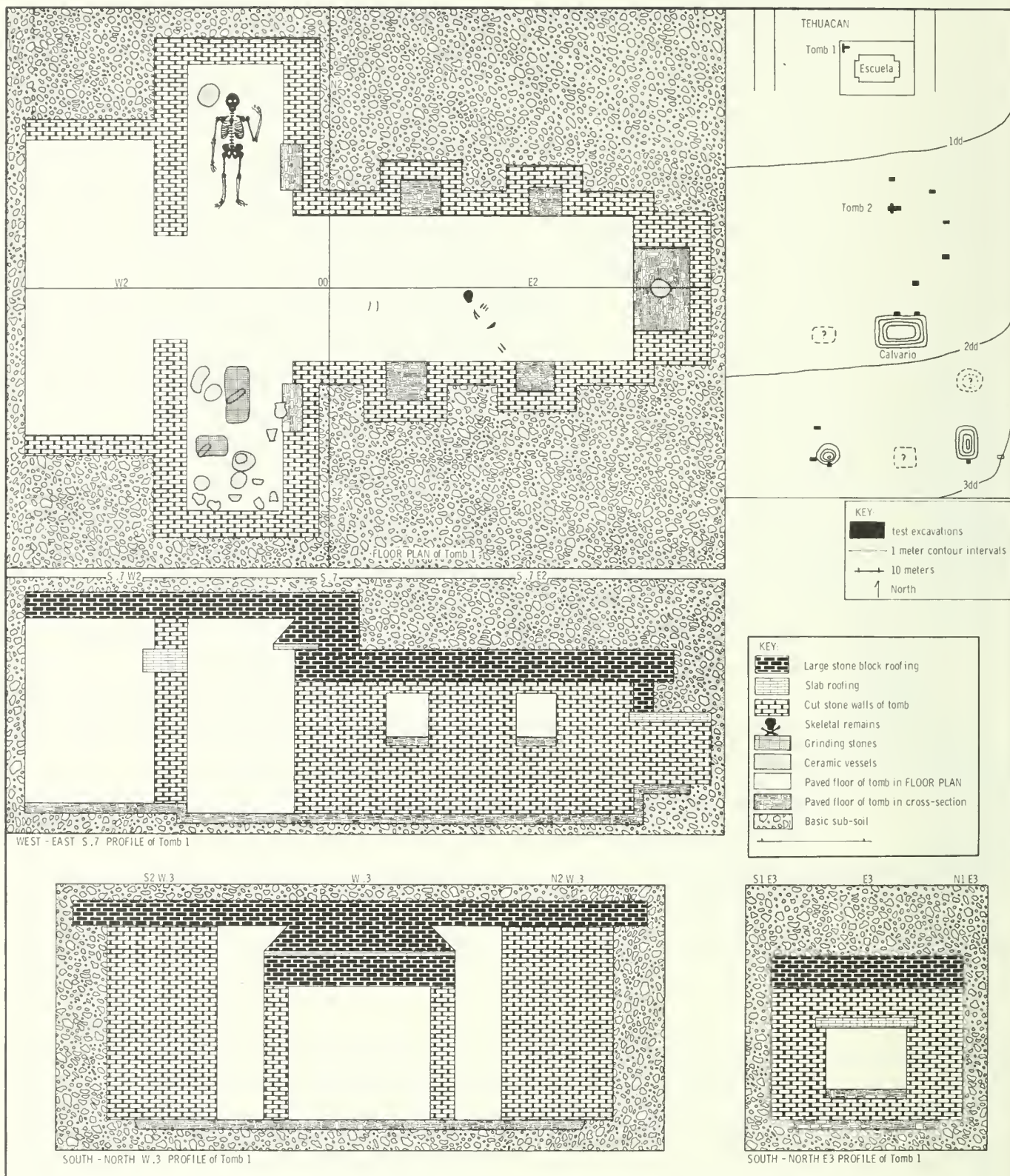


Fig. 177. Tr 366 sketch map (upper right), floor plan of Tomb 1 (upper left), and cross-sections of Tomb 1 (lower), a Late Palo Blanco nuclear valley town.

east and is well hidden from view by vegetation and rock fall.

Tc 317A. This is a small shelter west of the highway from Tehuacan to Huahuapan, at about Km. 18, quite near the onyx mines. The site was found in the side of a bank about 100 m. from the road. In front of the site and in the arroyo just to the west of it are a series of stone boulders that seemed to serve as check dams for high and low terracing and for field borders.

Specialized Sites

Tr 393 is discussed above.

Ts 20. This terraced agricultural area is located west of the Tehuacan Valley, in the west-central portion of the Zapotitlan Valley, some 6 km. south-southeast of Santa Ana Teloxtoc, and 8.5 km. west of Zapotitlan Salinas. *Ts 20* is situated on a gently-sloping natural terrace just east of a large, deep barranca, about 500 m. northeast of its confluence with the Rio Zapotitlan. The maximum extent of this area prepared for cultivation was approximately 100 by 500 meters. At least 14 linear field borders, following the contours of the land, formed low, agricultural terraces. The field borders were constructed of dry-laid, unmodified cobbles and boulders that ranged from 1 to 3 courses, about 15 to 75 cm. in height. They extend 20 to 100 m. in length and are 10 to 30 m. apart. The plots of land delineated by these low terracing walls were assuredly watered by a sheet-wash type of drainage, evidently characteristic of the immediate area. Wing-like extensions made of boulders had been carried back uphill from the ends of many of the main borders or terracing elements. Some of these extensions were apparently only a few meters in length, while others extended uphill the entire width of the plot to join the next terracing alignment. These wing walls probably were used to reduce soil and moisture loss at the sides of the terrace plots. Large amounts of flint on the surface indicate it also may have been used as a quarry.

Ts 321. This site is located about 400 m. south of the Rio Zapotitlan, about 2 km. southeast of Zapotitlan Salinas. Strung out along the flanks of a large hill, it covered quite a large area, about 400 m. long and 200 m. wide. Long lines of boulders, 10 to 30 m. apart, served as retaining walls or check dams. Some of these were field borders and low terraces. There were no noticeable house foundations on these areas, but large quantities of sherds, and even larger amounts of chipped flint, indicate that this site, besides having been used for irrigation, also had been used as a chipping

site or quarry. From many standpoints it may have been a small hamlet used by specialists in the flint-knapping industry.

Ts 346. This site is situated 4 km. to the southwest of Zapotitlan Salinas on both sides of the road to Los Reyes. No architectural features were noted on this hill flank, but there was a large number of lines of rocks forming terraces, field borders, and agricultural terraces. There was also a large amount of chipped flint debris, indicating a flint-knapping station or quarry.

Tr 447. This site is located in the northwest portion of the Tehuacan Valley, some 6.9 km. south of Tehuacan and 2.5 km. west of San Marcos, situated within Tecorral Canyon, about 600 m. downstream from the San Marcos Cave (*Tc 254*). The dominant feature of *Tr 447* is a dam, described in Volume 4.

Tr 258. *Tr 258* was found in the northwest section of the Tehuacan Valley, some 6.6 km. south of Tehuacan and 3 km. west of San Marcos. The site, located within Tecorral Canyon, a series of agricultural terraces, is immediately in front and to the north of *Tc 254* and very probably is associated with the cave. It is also discussed in Volume 4.

Tr 318, Tr 322, Tr 335, Tr 344, Tr 345, Tr 317-A, Tr 342, Tr 172, Tr 117, Tr 305, Tr 366-A, Tr 287, Tr 147, Tr 240, Tc 32, Tc 49, and Tr 118 are discussed above.

Tr 28. This site is located in the north-central portion of the Tehuacan Valley, approximately 2 km. northwest of the city of Tehuacan and 1.7 km. northeast of San Lorenzo, at the point where the Puebla-Tehuacan highway cuts through the Garcia Crespo estate. The site in the valley floor consists of four amorphous mounds in an L-shaped alignment. Their form and associated pottery suggest that the mounds were associated with the salt industry.

Tr 174. The survey discovered this site in the southwest corner of the Tehuacan Valley, about 3.7 km. west of Pueblo Nuevo and 1.4 km. south of Axusco. *Tr 174* is situated on the valley floor just east of the Cerro Tepetroje. About 40 large amorphous salt processing mounds of earth and gravel, as well as many rectangular salt evaporating pans outlined with slabs of limestone and travertine, probably formed by the same minerals that supply the saline water for the site, comprised the majority of the architectural features recorded. These were suitably located around several mineral streams that now flow intermittently. A small

Late Palo Blanco Seasonality Data

		Tc 272, C, 1-3	Tc 272, B, 1-2	Tc 272, A, 1-3	Tc 50, V, A, B	Tc 255, B	Tc 254, C ¹	Tc 254, B	Tc 50, IV	Tc 35, E-F, 3-4, 1-6	Tc 35, D, 1-2	Tc 287, B	Tc 295	Tc 200
MICRO-ENVIRONMENTS														
	El Riego Oasis									X	X			
	Travertine Slopes													
	arroyo flanks					X	X	X						X
	slopes													
	Alluvial Slopes													
	valley flanks				X				X					
	Canyons and Dissected Alluvial Slopes													
	canyon flanks	X	X	X								X	X	
SEASONALITY														
Fall	CIRUELA FRUIT	X	X	X	X					X				
	AVOCADO FRUIT				X				X	X	X			
	CHUPANDILLA FRUIT	X	X	X	X			X	X	X				
Summer	Bean seed								X	X	X			
	SAPOTE FRUIT				X			X	X	X	X			
	Squash fruit and seed	X						X	X	X	X			
	Corn seed	X	X	X	X	X	X	X	X	X	X			
	FETAL DEER								X			X		
	Pepper seed								X					
	LIZARD				X			X				X		
Spring	milling stones	X	X	X	X	X		X	X	X	X			
	Amaranth seed				X			X	X			X		
	Mesquite seed		X					X	X					
	Grass seed	X		X	X		X	X				X		
	Setaria seed						X	?	X					
	Cardon seed		X											
	Leucaena seed	X		X	X		X	X	X			X		
Winter	Pochote seed	X	X	X	X		X	X		X	X			
	DEER ANTLER									X				
Fall	TETECHU FRUIT	X												
	COYOL FRUIT	X		X								X		
	COSAHUICO FRUIT		X	X	X			X	X			X		
COMPONENT DIMENSIONS														
	length in meters	11	15	15	16	4	4	9					5	30
	width in meters	4	4	4	4	2	3	6					3	5
	extent in sq. meters	44	60	40	64	8	12	54					15	150
SETTLEMENT FEATURES														
	cave niche burial	1								2	2			
	cache pit							2						
	fire pit	2	2				1	2			1			
	storage pit				3			1	2	2				
	roasting pit		2			1								
	fired area	1			1			1						
SETTLEMENT PATTERN TYPES														
	Macroband dry-season camps													X
	Macroband spring-summer-fall camps	X												
	Microband spring-summer-fall camps		X	X										
	Microband all season camps									X	X			
	Microband summer-fall camp								X					
	Microband summer camp					X								
	Microband dry-season camps											X	X	
	Microband spring-summer camps						X	X						
	Microband fall camp				X									
	Microband dry-season water-source camps													

Tc 49	Tc 260	Tc 32	Tc 33	Tc 14	Tc 17	Tc 257	Tc 30	Tc 68	Tc 124	Tc 215	Tc 317A
		X	X				X				
	X			X		X			X	X	X
								X			
X					X						

10	10	9	6	50	10	26	3	5	25	10
4	2	5	3	4	3	6		2	7	2
40	20	45	18	200	30	156	21	10		20

X X X X

			X		X		X			
X					X		X	X		X
	X	X	X							

TABLE 36
Late Palo Blanco Specialized Sites

	Tf 393	Ts 20	Ts 321	Ts 346	Tf 447	Tf 258	Tf 318	Tf 322	Tf 335	Tf 344	Tf 345	Tc 317A	Tf 342	Tf 172	Tf 117	Tf 305	Tf 366A	Tf 287	Tf 147	Tf 240	Tc 32	Tc 49	Tf 28	Tf 174	Tf 171	Tf 221	Tf 270	Tf 121	Tf 118
<i>with associated habitation</i>							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X				X	X
<i>with associated habitation (salt hamlets)</i>																													
MICRO-ENVIRONMENTS																													
El Riego Oasis																					X								
Travertine Slopes																													
arroyo flanks		X		X	X	X	X	X	X	X	X	X	X													X			
slopes			X																										
Valley Center Steppe																													
steppes																													
hilltops																													
Alluvial Slopes															X														
valley flanks																													
hilltops																													
Canyons and Dissected Alluvial Slopes																													
canyon flanks																													
hilltops																X													
SITE DIMENSIONS																													
length in meters		100	400	50																									
width in meters		100	200	30																									
extent in sq. meters		10,000	80,000	150																									
FEATURES																													
hillside agricultural terraces		X	X				X	X	X	X	X	X	X																
valley agricultural terraces																													
check dams																													
valley dams																													
canals																													
salt industry																													
salt mounds																													
salt bins																													
salt dams																													
house foundations																													
mounds																													
quarries																													
pit burial		X	X	X																									
slab-lined rectangular tombs																													
cruciform tombs																													

canal or aqueduct was noted leading from one of the mineral springs to several of the slab-outlined salt pans or to the shallow, apparently natural, depressions. Some of these depressions were dammed with stones along one side and probably served as reservoirs or additional salt evaporation pans. A few alignments of unmodified boulders representing the remains of house foundations were seen, but they are far from numerous and are of the single-room variety.

Tr 171. The site is located approximately 5 km. west-northwest of the village of Pueblo Nuevo and 400 m. south of Axusco in the southwest part of the Tehuacan Valley. *Tr 171* is a sherd area situated on a small north-northeast by northwest oriented elliptically-shaped hill or terrace. No architectural features were noted, but there was a great deal of salt and salt-pan material. We may consider this to be a salt-industry working site and not necessarily a village or even a hamlet.

Tr 221. At this site a line of about 20 amorphous mounds ran northeast along the valley floor about 1 km. northeast of San Marcos. The associated pottery suggests they were connected with the salt industry.

Tr 270. About 1 km. west of the pump house of San Lorenzo were four to six amorphous mounds associated with about ten single-room house foundations. We consider this site a salt hamlet.

Tr 121. Just across the Rio Salado from Pueblo Nuevo on the flanks of a low hill were about ten amorphous conical mounds that we believe were associated with salt-making.

Indeterminate Occupations

Ts 204 is described in Chapter 5.

Tr 355 (Early Santa Maria Phase) is described above.

Tr 146, Tr 106, Tr 143, Tc 6, Tr 302, Tr 304, Tr 180, Tr 300, Tr 84, Tr 186, Tr 41, Tr 79, Tr 73, Tr 232, Tr 102, Tc 13, and Tc 31 (Early Palo Blanco Phase) are described above.

Tr 95, Tr 108, Tr 283, Tr 97, Tr 98, Tr 284, Tr 282, Tr 308, Tr 319, Tr 107, Tr 42, Tr 59, Tr 168, Tr 64, Tr 85, Tr 320, Tr 192, Tr 198, Tr 199, Tr 188, Tr 261, Tr 181, Tr 122, Tr 370, Tr 347, Tr 336, Tr 341, Tr 424, Tr 414, Tr 415, Tr 418, Tr 145, Tr 454, Tr 140, Tr 332, Tr 288, Tr 289, Tr 246, Tr 208, Tr 226, Tr 228, Tr 229, Tr 233, Tr 293, Tr 236, and Tr 290 (Early Venta Salada Phase) are described below.

Tr 25, Tr 155, Tr 75, Tr 139, Tr 350, Tr 165, Tr 80, Tr 412, Tr 357, Tr 340, Tr 339, Tr 337, Tr 330, Tr 328, Tr 327, Tr 324, Tr 315, Tr 314, Tr 310, Tr 245, Tr 244, Tr 242, Tr 238, Tr 231, Tr 220, Tr 216, Tr 211, Tr 294, Tr 286, Tr 191, Tr 187, Tr 185, Tr 167, Tr 166, Tr 163, Tr 160, Tr 135, Tr 126, Tr 326, and Tr 1 (Late Venta Salada Phase) are described below.



Fig. 178. The reconstructed Early Venta Salada settlement pattern in the Tehuacan Valley.

The Early Venta Salada Settlement Pattern

By the eighth century of our era a major cultural change in the Tehuacan Valley is marked by the rise of the early part of the Venta Salada Phase, 700 to 1150 A.D. The phase and its ceramics were not well-defined in our initial excavations, because all of our components come from cave occupations with relatively limited amounts of sherds that might reflect rather atypical cultural activities. However, our initial endeavor did net 98 sites and found Early Venta Salada sherds on still another 141 sites. This indicates only a slight increase (3) in the number of recognizable sites over that of Late Palo Blanco. Indeterminate occupations are more frequent (36 more).

However, it is the kind of sites and not the number that makes the Venta Salada Phase culturally distinct from Palo Blanco. Now, a completely new type of settlement occurs at Tr 319, a huge fortified site on a hilltop characterized by large terraced areas and pyramids with large monumental staircases, cylindrical columns, and large (looted) tombs. The cut stone columns and slab architecture set in mortar and often covered with stucco are also very different, and many of the smaller habitations are multi-roomed rather than single-roomed. Although we were unable to adequately map this site or surface collect systematically, our superficial survey did suggest that these were areas (households or barrios) containing many full-time specialists. Only further intensive investigation can determine whether Tr 319 was really a small city or a very large town, but either way, it far exceeds any settlement encountered in earlier times. Tentatively, we consider it a small fortified hilltop city.

This distinctive change in settlement type is equally true for the other Venta Salada towns. The number of towns is roughly the same as were found in Late Palo Blanco. Nine were on hilltops, three were valley sites, and one site, Tr 237, was in a new type of location; that is, on the flanks of a hill and adjacent valley floor. Three of the hilltop town sites have large fortification walls unlike anything found in the previous phases or subphases. Two of these fortified towns (Tr 334 and Tr 213) are considered to be nuclear, with two plazas and a ball court area nested together in each case. Unlike the Palo Blanco nucleated towns, however, these Venta Salada fortified sites, as well as the unfortified hilltop town, Tr 83, have other plaza areas surrounded by truncated pyramids that are widely separated from the nuclear plaza areas. The other three nuclear towns, all on hilltops, were less adequately described in our field survey notes, but they seem to be more like those of Palo Blanco, with plaza areas nested together and no ball courts or staircase areas noted. The other seven towns, all with dispersed plaza areas, are more heterogeneous, like the dispersed towns of Palo Blanco. Three of these (including the fortified one) are on long hills, while three are in the valley, two along the river flanks and the third, Tr 454, between two fossil canals near Tehuacan. Notes mention a parallel side ball court for one of these, but there is no mention of large monumental staircases or columns for any. Superficially, they are like those of Palo Blanco, but their construction of cut slabs set in mortar, sloping-walled pyramids, and multi-room houses—all covered by plaster—readily distinguish these sites, as well as all other

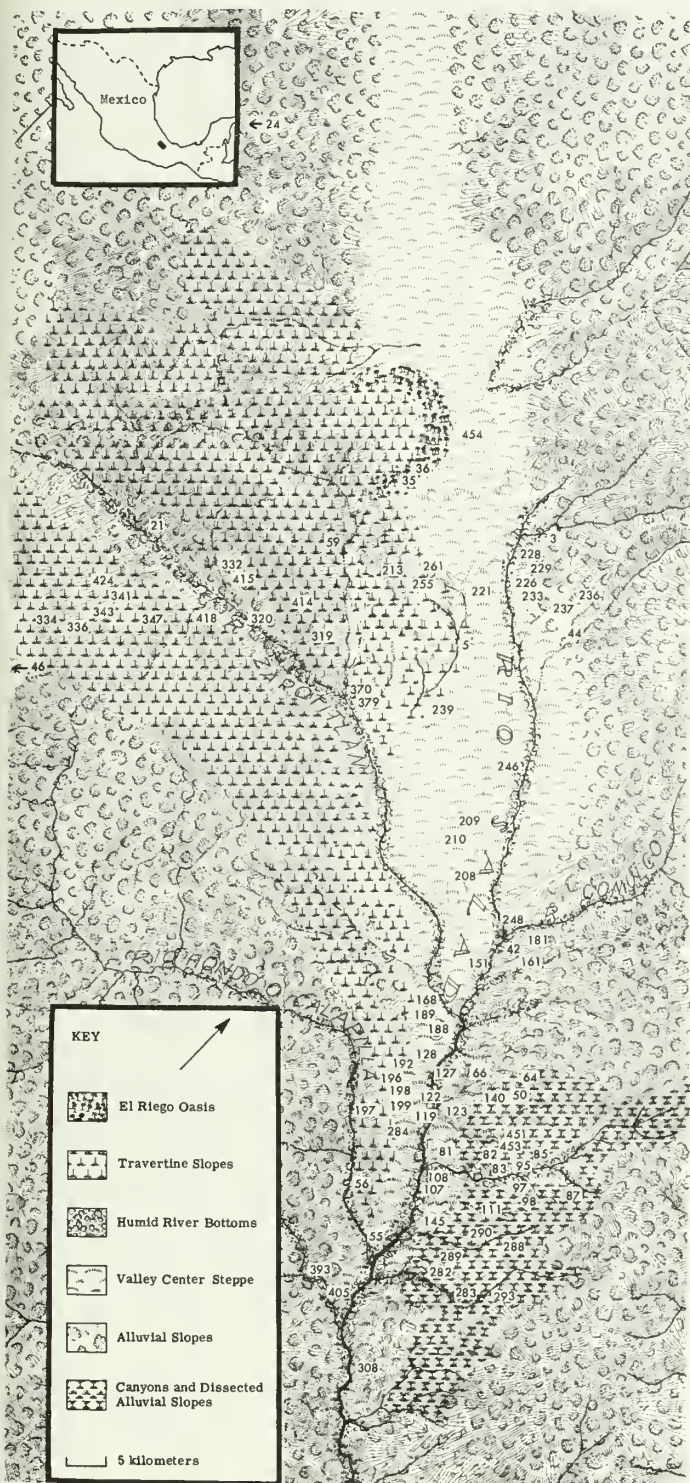


Fig. 179. An ecozone map of numbered Early Venta Salada sites in the Tehuacan Valley.

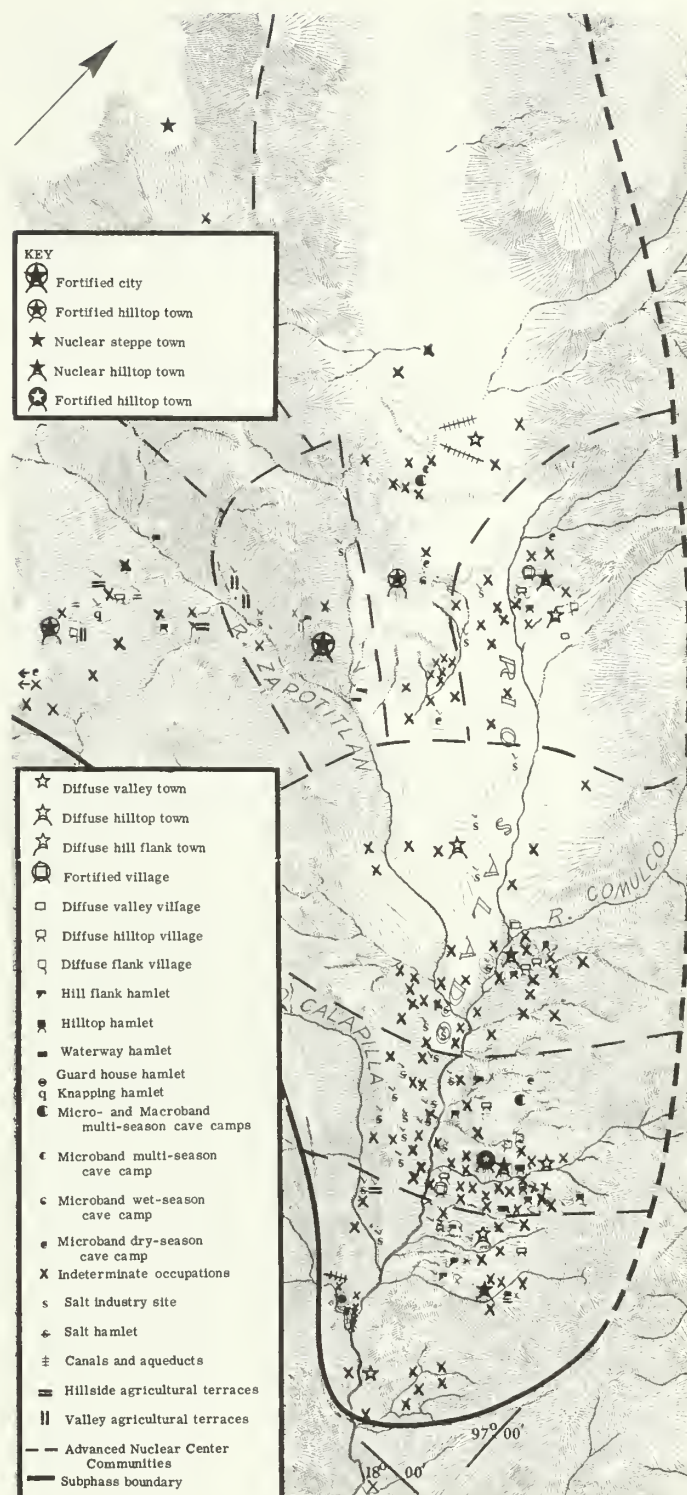


Fig. 180. Map of Early Venta Salada settlement pattern types in the Tehuacan Valley.

Early Venta Salada sites, from those of the earlier periods. These architectural features also distinguish Venta Salada villages from those of their predecessors.

The Late Palo Blanco trend away from the nucleated village continues into the new subphase. The central ceremonial or administrative area is diagnostic of this type of village, and their decline, reflecting a lessening emphasis on ceremonialism, is probably significant. The first occurrence of two fortified hilltop villages further tends to confirm such a hypothesis.

This decline in the number of villages, from Late Palo Blanco (25) to Early Venta Salada (18), is offset by a major increase in the more mundane hamlet, 20, in Late Palo Blanco to 33 in Early Venta Salada. While the hamlets have many features in common with their predecessors, there are four main differences. One is that the hamlets of Palo Blanco were predominantly composed of single-room structures, while those of Venta Salada are mainly multi-room habitations. Secondly, the structures of Venta Salada are made of cut stone slabs, set in mortar, often with paved floors, all of which are covered with plaster, often painted, and many have columns. Thirdly, there are one or two hamlets with military features (fortifications or guard houses); and finally, there are eleven hamlets associated with salt manufacturing features, perhaps indicating hamlets that included many full-time specialists.

These latter sites, with their large areas for salt-making, present problems to one attempting to estimate populations. Also, the fact that there was some sort of occupation (indeterminate) at some 141 sites compounds the problem. The area covered by the other habitation sites for Early Venta Salada of 3,837,979 square meters is virtually the same as that for Late Palo Blanco (3,884,832). However, when small house mounds and habitation structures for the two subphases are counted, we see a marked decrease in single-room structures from 1,592 to 187, and a marked increase in multi-room structures from 24 to 923, as well as an increase in the number of small mounds (145 to 150). Although excavation of some of the habitation structures to determine the possible number of occupations is badly needed, there is at this time some suggestion that a slight population increase took place. The Early Venta Salada population probably fell somewhere within the range of 25,000 to 35,000 people—an estimated figure greater than that of Late Palo Blanco, but less than that of Early Palo Blanco.

While there were no noticeable differences in the populations at the habitation sites, Venta Salada does

have a host of new specialized sites. Salt hamlets had increased from two to eleven and the fourteen Early Venta Salada salt production sites without discernible habitation structures represent a significant increase over the five noted in Late Palo Blanco. These industrial sites were much larger and had many more complex features, such as filtering mounds. Also, five quarry sites occurred. Further excavations of Zones B and C of El Riego Cave revealed evidence of specialists in the textile and bark cloth industries. Obviously, the fortifications imply that there were now soldiers or military specialists of some sort. The artifacts suggest other specialists, such as artisans, and the mold-made pottery suggests the beginnings of a ceramic industry.

Other specialized sites are connected with water control. In this period we have definite evidence of two or three major canal systems, but, interestingly enough, large dam structures do not seem to have been constructed. These apparently were replaced by small valley field irrigation terraces with small check dams, or by large hillside linear field borders.

Few ceremonial features were found. Those that did occur were types different from previous periods. At twelve sites collections of xantil fragments were collected. It is difficult, without excavation, to tell whether the fragments were located in special shrines, or in special habitations of perhaps high-ranking individuals, or special kin groups. We suspect probably the latter. Two sets of large cruciform tombs were seen; one of these was littered with xantil fragments. Remains of other burials were not numerous. They included flexed or bundle burials in pits, or in pots, or in cave niches. One gets the impression from the burial system (few tombs but many simple burials), the xantiles (few houses with them but most without them), the many house structures and few ornate large pyramids, and from the settlement pattern (many hamlets and some towns, but few villages transitional between the two), that we are dealing with some sort of bifurcated social system—the haves and the have-nots—rather than the hierarchical three-ranked system of Palo Blanco.

Many of our clusters of sites, now communities with fortifications indicating the use of force, may be considered political entities and reflect this bifurcated social system. Our southernmost community around Los Cues has a single nuclear town with two subsidiary towns, five hamlets, 25 indeterminate sites, and, significantly, only two villages. North of it the Tilapa River community includes a nuclear hilltop town, a fortified town, a dispersed town, and a fortified village, but fourteen hamlets and only four villages. Our

westernmost community near Acatepec and the one just east of its center, near Zapotitlan, both show a similar pattern, with the latter boasting a fortified city. Our center valley community, in the general area of Calipan, is only slightly irregular with a nuclear and a dispersed town, three hamlets, six salt sites, and three small village sites.

Of our six well-defined communities, only one does not conform to this pattern. This is the one just east of Tehuacan, which has two towns and a fortified village, but three other village sites and only a single hamlet. However, this is a zone with many large Late Venta Salada sites that could very well be covering small hamlet occupations.

Our other two communities, both in the north, are poorly defined and could very well be southern extensions of larger communities centered in the general direction of Cholula. This lack of definition of the northern border of our phase reflects a problem in classification, for without a better definition of the boundaries of Cholulteca I and Early Venta Salada, the north and west boundaries of Venta Salada must remain undefined until further archaeological investigation has been done. To the south, however, the cultural region is well established. Early Postclassic material from Cuicatlan, and from Monte Alban IV of the valley of Oaxaca, is radically different from that of our own area. The eastern boundary remains the Sierra Madre, for the Early Postclassic sites of Veracruz bear only a general resemblance to those of Early Venta Salada.

Thus, the affiliations of the Tehuacan Valley shifted radically during the period from 700 to 1100 A.D. Previously, the Tehuacan Valley had appeared to be just a northwestern extension of the culture at the valley of Oaxaca, but now Venta Salada seems to be a south-eastern extension of a Mixteca-Puebla type of culture. Was this rapid shift due to cultural diffusion or was it a result of an invasion, as the local mythology suggests? Certainly the line of fortified sites across the north end of the valley suggests a resistance to the northwest, perhaps to an invading Mixtec or Nahuatl-speaking political entity, or even to the Toltec (Nonolco) empire.

The Survey Sites

Habitational Sites

Tr 24. From many standpoints, this village site, almost 45 km. west of Tehuacan and about 1 km. south of Ixcaquixtla, Puebla, was out of our area of survey. However, somewhat to our surprise, the majority of

the Postclassic sherds found on the three large mounds at this site were Early Venta Salada types, although the Classic Period sherds were mainly Thin Orange. This certainly appeared to be the western boundary of the Early Venta Salada Phase.

Tr 210. Centrally located in the valley, approximately 3.7 km. south-southwest of San Sabastian Zinacatepec and 2.6 km. east-northeast of San José Miahuatlan, Tr 210 was situated on the summit of an east-west oriented, elliptically shaped, hill. A series of mounds were dispersed along the top of the hill, and the summits of some of these mounds had been surfaced with pebbles and cobbles and then covered with stucco. In the west-central portion of this diffuse hilltop town, four of the mounds had been built at the corners of two north-south by east-west oriented plazas, while to the east were two mounds on either side of the plaza, which had xantil fragments on their summits. Some 15-20 building foundations made of cut-stone slabs comprised the only other architectural record for this ruin. Some of these house foundations were of the multiple-room variety. Numerous salt production mounds were observed on the valley floor surrounding the hill on which Tr 210 had been built, and quite possibly were contemporaneously in use, if not actually associated with the site.

Tr 289. This linear hilltop hamlet was situated 3 km. to the southwest of Teotitlan in the San Martín district. On the top of the hill called Cerro Malenche, as well as on the flanks, were about 30 house foundations, 15 of the multiple-room variety. These were widely spaced, and we probably would have discovered more, but brush completely covered most of the hill. There also was quite a lot of plaster and paint on the surface.

Tr 237. This town was situated about 1.5 km. north of Nativitas and about 2 km. south of San Diego Chalma. It was at the flanks of a large hill. Strung over the sides of this hill were about 20 house foundations outlined by crude blocks and often covered by stucco or plaster. About half of these were of the multiple-room variety while the other half were smaller. Most predominant in the site, however, were 15 mounds situated around the same contour of the low hill flanks or foot of the hill, while four mounds were fairly far up on a small prominence. These mounds were all of the boulder variety and were quite small.

Tr 108. This small hilltop village site was situated on the first hill to the southeast of the junction of the Rio Tilapa and the Rio Salado, in the general district of

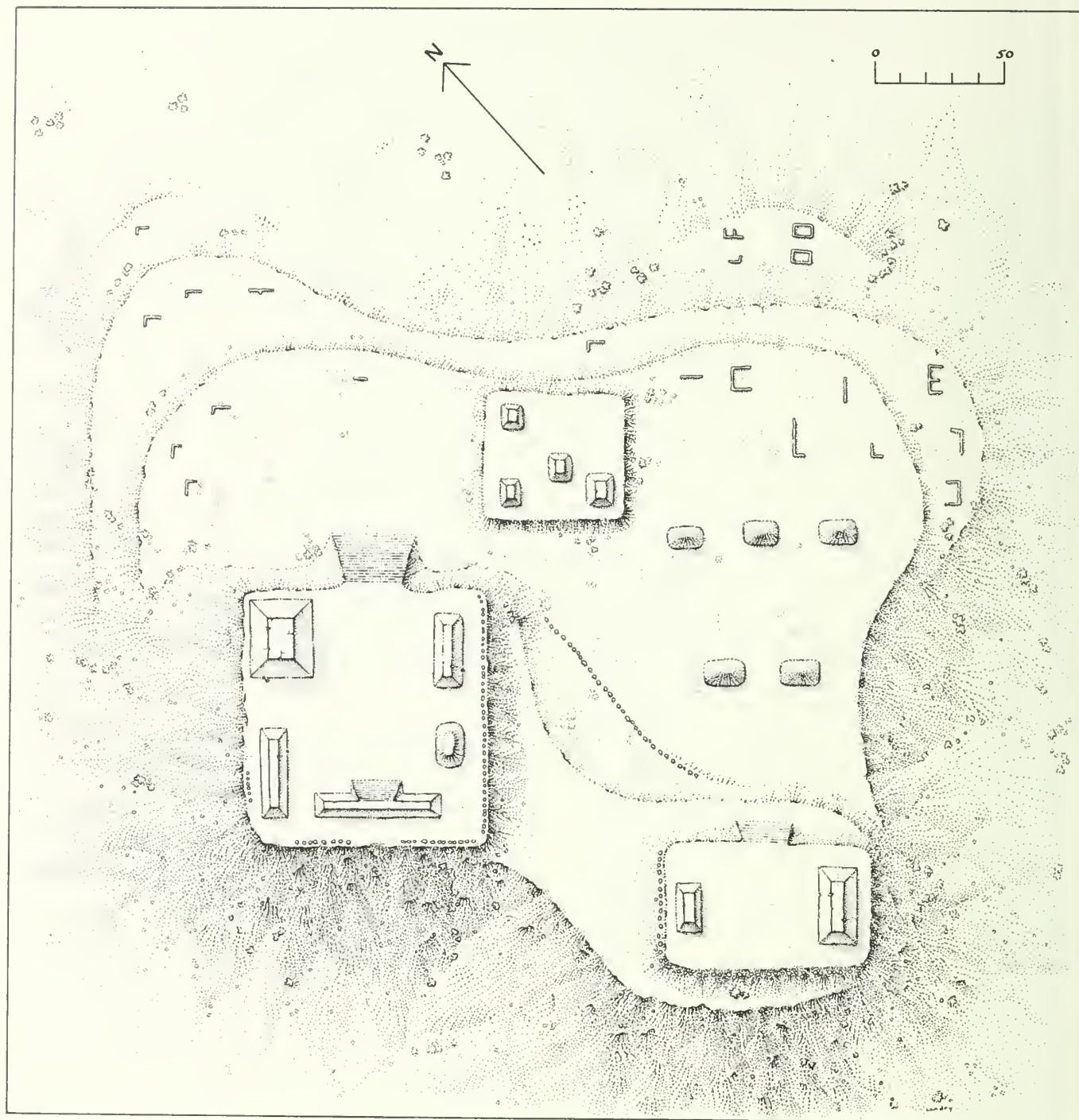


Fig. 181. Sketch map of Tr 334.

San Antonio. There was quite a lot of plaster, and the house foundations were outlined by uncut boulders. On the top of the hill there seemed to have been a rather large plaza area surrounded by these multi-room house foundations.

Tr 248. Located in the east-central part of the valley, about 5.4 km. southeast of San Sebastian Zinacatepec and 3.7 km. west of Calipan, Tr 248, a diffuse valley village, was situated on the valley floor, 150 m. to the west of the Rio Comulco. Some multi-room house



Fig. 182. Sketch map of Tr 454.

foundations, made of boulders, were located about 100 m. to the east of the single mound.

Ts 21. This site is 5.6 km. to the west of Zapotitlan on the north bank of the Rio Zapotitlan and on the flood plain just below the Cerro Gavilantepec. It was a small

hamlet or flint-knapping workshop covered with flint and a few potsherds.

Tr 228. Tr 228 was about 400 m. directly east of San Diego Chalma and about 3 km. southeast of Tehuacan. This fortified village was situated on a small hill, ex-

tending down the sides. It was full of xantil offerings, most of which appeared on top of one small mound. Also on top of the hill were about 5 multi-room house foundations made out of stone slabs. The edge of the hill had been terraced, but there were no other architectural features associated with the side of the hill.

Tr 334. This site, in the southwest portion of the Zapotitlan Valley, about 10 km. southeast of Zapotitlan, was situated on a large hill called Cerro Lagunilla, or Cerro de la Hierba, just below the town of Acatepec. Below the walls of this fortified hilltop town, down the flanks of the hill, were terraces for agriculture and for housing. About 20 small multi-room house foundations, found mainly on the hillsides, were made of neatly cut stone, usually covered by stucco. Also, among the refuse were quite a number of fragments of round stone columns, indicating that at one time there had been some larger buildings or temples in the area with roofs held up by columns. Of the three roughly rectangular plaza areas, two were surrounded only by walls, while the third plaza area had 5 temples down in the terrace-plaza areas. A monumental stairway led up the side of the hill to the south two plazas. On the hill there was a great deal of chipped basalt, indicating the possibility that knapping specialists inhabited the town. (See Fig. 181.)

Tr 454. This site in the plains was about 1.5 km. northwest of Tehuacan to the south of the Puebla-Tehuacan highway, about halfway between it and the Tehuacan-Veracruz highway intersection in the town of San Lorenzo. The diffuse valley town consisted of 6 small mounds and one large platform mound. The roughly circular mounds were made of earth and gravel and there was no facing apparent, perhaps due to destruction by cultivators. Three to the south were somewhat larger and oval in form, and on the largest platform mound were situated 4 small circular mounds or platforms for houses. These three did not seem to be connected with a plaza; however, the four mounds to the north did form a plaza area, and another small plaza area was formed by 3 of the small mounds on top of the larger platform mound. A fossil canal extending down from El Riego passed extremely close to these groups of mounds. The smaller mounds contained quite a large amount of salt-working sherds. (See Fig. 182.)

Tr 107. This village was situated on the second small hill northwest of San Antonio Nanahuatipan just east of the Rio Salado, about 2 km. south of the mouth of

the Rio Tilapa. The hill was bordered by a low slab-block wall which may have served either as a terrace to give the top of the hill a level surface, or as a fortification. On top of this small hill were a number of house foundations outlined by boulders. About 15 of these were single-room while about another 15 were of the multi-room variety. There were also two low mounds of boulders. These small mounds were parallel to each other and connected on one end by a low ridge forming a plaza-like area. In front of its open end an apron-like plaza was situated about 75 cm. below. (See Fig. 183.)

Tr 181. This nuclear hilltop hamlet site was located in the town of Calipan, about 50 m. north of the marketplace. Situated on a small nearly circular hill, it consisted of several building foundations constructed of boulders and large limestone slabs. All of these foundations were of the multi-room type. Other structures were probably destroyed or covered by modern activities. Prior to the survey, the area had been tested by Sr. Eduardo Noguera of the Instituto de Antropología e Historia (Noguera, 1940).

Tr 236. Located in the northeast part of the valley, approximately 11.3 km. east-southeast of Tehuacan, 5.9 km. north of Altepexi, and 500 m. north-northwest of the Hacienda La Trinidad, *Tr 236* was situated on the valley floor on the west flank of the huge Cerro de Peñones. Three stepped platform mounds of earth with stone block facing were constructed around a rough plaza area on the valley floor at the base of the cerro. The largest portion of the site, however, was located on a series of artificial and natural terraces ascending the lower flanks of the cerro overlooking the three mounds just mentioned. All of these terraces were outlined with retaining walls of stone. Numerous building foundations and several long mounds of earth faced with cut stone were observed on these terraces. One of these mounds was plainly truncated or stepped in form. About 100 m. northwest, and quite possibly associated with this site, were found two large mounds of stone that had been constructed on an artificial terrace.

Tr 341. This site, located about 8 km. west of Zapotitlan and 1 km. north of the Tehuacan-Huahuapan road, was about 1 km. north of the Colonia de San Martín. The site was on a small hill. The flanks of the hill were terraced, and there were about 10 house foundations strung along the sides of the hill. On top of the hill itself were two mounds about 3 m. wide and 5 m. long that faced each other and had a plaza in between them, open to the east and west ends. These mounds

Table 37 (continued)

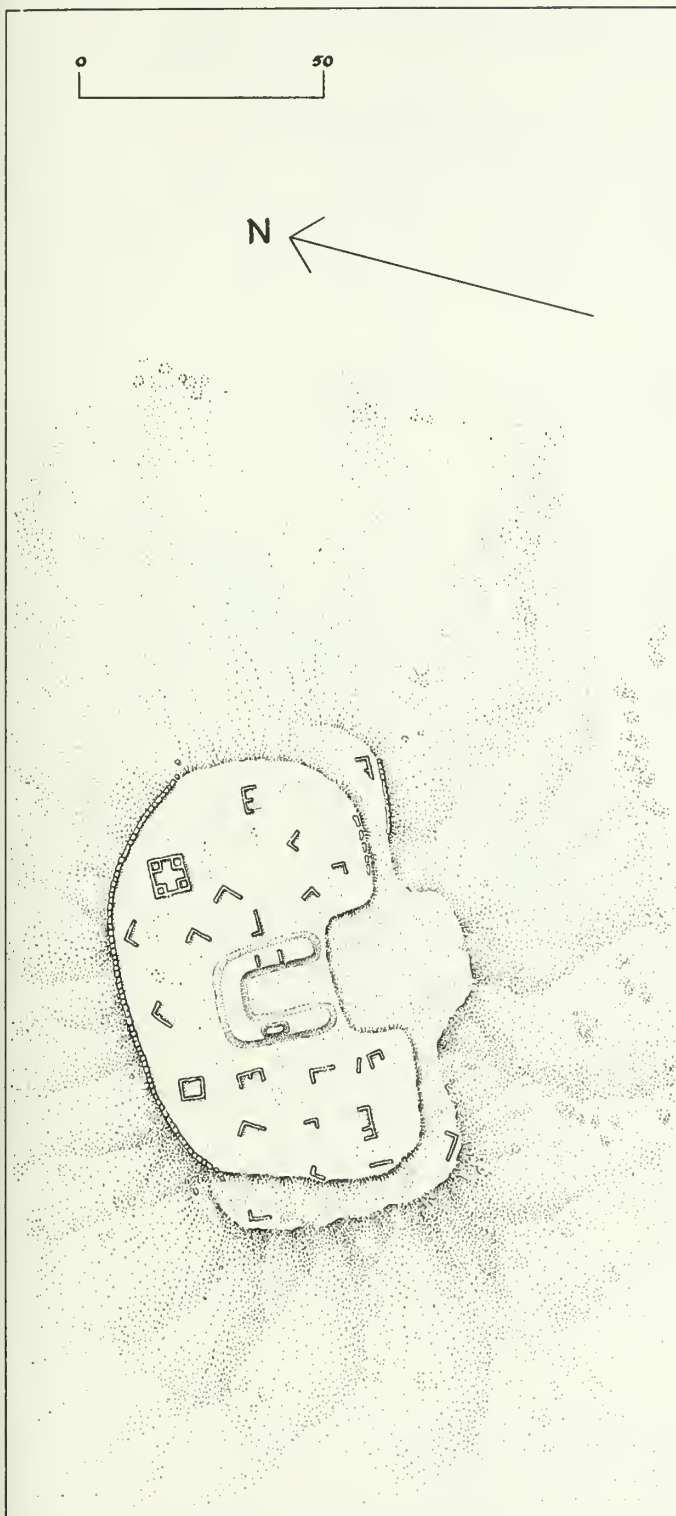


Fig. 183. Sketch map of Tr 107.

were not only made of cut-stone slabs, but also had definite stucco floors.

Tr 87. Tr 87, a small hilltop hamlet, was about 1.5 km. to the east-northeast of the town of Tilapa. The sides of the hill were terraced, and both on the top of the hill as well as on the terraced sides were house foundations of black volcanic boulders.

Tr 308. This dispersed town was located south of the valley of Tehuacan, approximately 3.5 km. southwest of San Juan Los Cues, Oaxaca. It overlooked and was just east of Marker 213-214 of the Tehuacan to Oaxaca railroad along the Rio Salado. It was situated on two small, elliptically shaped, northwest-southeast oriented hills, and on the natural terrace to the southwest that forms the east bank of the Rio Salado at this point. The ruin was composed of 40 to 50 structure foundations built of large igneous river boulders, sandstone slabs, and blocks, mainly on the terraces, while on the hills were 5 to 10 mounds constructed of earth and boulders.

Tr 42. This nuclear hilltop town was about 3 km. southwest of Calipan on top of a small hill called Cerro Colorado, overlooking the Rio Salado just to the west. The site covered a very large area, mainly on the flanks of the hill, where over 100 multi-room house foundations were found. At least 75 stone mounds of varying dimensions were strung out along the flanks as well as on the hilltop. They seemed to surround at least four different, widely separated, rectangular plazas with rectangular platforms in their centers. However, it was extremely difficult to tell exactly how many there were because of dense vegetation. It might be added that, on the north side of the site, there seemed to have been a large quarry for red stone to build these houses. Also, up the flanks of the hill leading to some of the plazas were a number of very large stairways. The tops of some of these mounds often contained large numbers of xantiles, and so seemed to have served as shrines during some period.

Tr 290. South-centrally located in the valley, Tr 290 is some 2.5 km. west-northwest of San Martín Toxpala and 1.9 km. southwest of Teotitlan. This dispersed town is situated on the flattened tops and flanks of three large elliptically shaped hills arranged generally in a west-southwest, east-northeast orientation. The architecture noted on each of these hills consisted of artificial terraces with about 15 multi-room house foundations and at least twelve mounds of large river boulders surrounding at least three widely separated rectangular plazas.

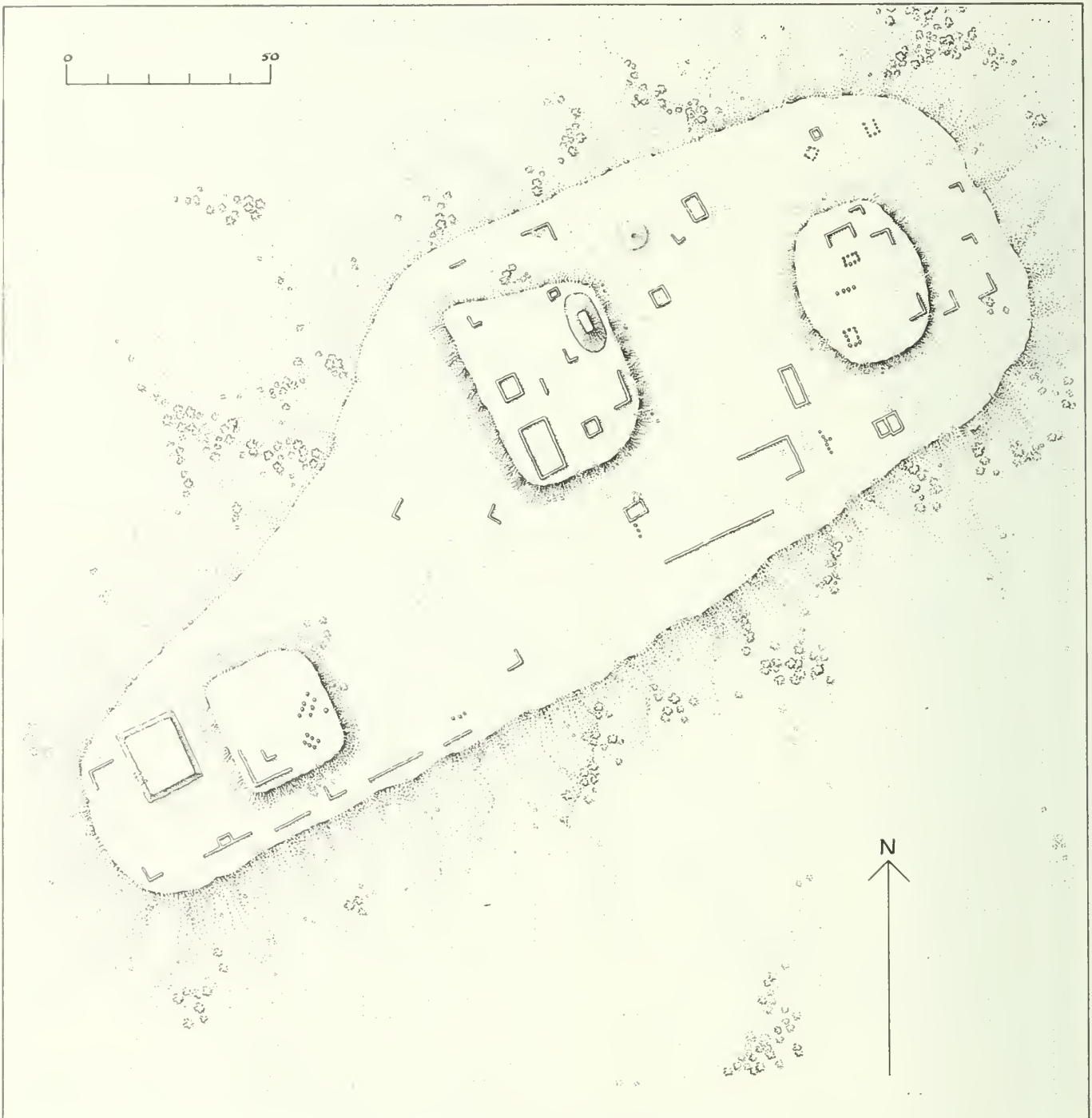


Fig. 184. Sketch map of Tr 82.

Tr 85. This site is on the plains to the north of the Rio Tilapa and is 1.8 km. northeast of the town of Tilapa. The town strung along the river for about 600 m., and in some places extended as much as 200 m. back from the river. Distributed over this area were over 70 house

foundations of boulders and crudely-cut blocks. All of these house foundations were rectangular, and 50 seemed to be of the single-room variety. Located in three distinct parts along this river edge were three definite plaza areas which had both square and rec-

tangular mounds surrounding them on all four sides. Also, one had next to it a possible ball court composed of two parallel mounds.

Tr 97. This hamlet was situated on a very small hill about 1 km. northeast of Tilapa. On top of the hill, oriented southwest to northeast, were many house foundations outlined by stone blocks and often covered with stucco. A few occurred on the terraced south slope of the hill.

Tr 98. This hamlet site was only about 50 yards east of *Tr 97* on the flanks of a nearby hill. The northern flanks were covered by similarly constructed house foundations.

Tr 82. This town site was on a long northeast-southwest oriented hill about 1.5 km. west-southwest of Tilapa. The sides of the hill were terraced and had house foundations, as did the top of the hill. On the two ends there were plazas surrounded by truncated pyramids. Along the southwestern edge of the hill were two portions of long walls suggesting that the hill was fortified. (See Fig. 184.)

Tr 283. This nuclear town was located just south of the Tehuacan Valley in the state of Oaxaca about 2.5 km. south-southwest of San Martín Toxpala and 3.3 km. northwest of San Juan Los Cues. *Tr 283* was situated on the summit and flanks of a high, elliptically shaped, west-northwest by east-southeast oriented hill called Amatepec. Large mounds were found on the summit; we could make out at least two groups of mounds, but whether they were of one or two plazas could not be determined. There were also a number of multi-room building foundations around the top edges of the hill, as well as on the terraces, made with neatly-cut stone slabs along the flank of the hill, where some single-room house foundations were also found.

Tr 123. This hamlet site consisted of house foundations on the top and west flanks of two north-south oriented hills, just east of the Rio Salado about 1 km. west of Aldama.

Tr 161, Tr 161A, and Tr 161B. These hamlet sites were about 1 km. directly south of Calipan, strung along the tops of three hills. *Tr 161* had a possible mound and 8 to 10 house foundations on them of the single-room variety; *Tr 161A* had about the same number of house foundations. There also is a possibility that the third hill, *Tr 161B*, which had been badly dug into and had brick-making ovens, formerly had foundations also, but all we found when we looked were sherds.

Tr 288. This village site is on a mountain ridge, Cerro Tehuehue, about 1 km. northwest of San Martín Toxpala. The mountain-top is long and narrow and is oriented east and west. Strung along the top of this ridge were about 30 multi-room house foundations. The sides of the hill had been terraced, but no houses could be determined. On top of the ridge itself were two rectangular mounds, oriented east and west, facing each other over a narrow plaza. We received reports that in the general area of these two mounds there had been, at one time, stone disc columns, but we could find none.

Tr 347. This hamlet site is about 3 km. west of Zapotitlan and just north of the Tehuacan-Huahuapan highway at Km. 26.45. It consisted of 3 flint-chip covered multi-room house foundations along the slope of the second hill west of Zapotitlan.

Tr 405. This is another site next to the Xiquila Aqueduct, about 100 m. upstream from the hydrographic station of the Papaloapan Commission. The site, overlooking the Rio Xiquila, consisted of what we thought were one large house, three multi-room houses, a pentagonal house, and a guard house, associated with linear borders that definitely were connected with the aqueduct itself.

Tr 229. This hilltop site was 2 km. east-northeast of the town of Chalma and south of the town of Tehuacan. The town is situated on the top of the hill and all the way down the west side. Both sides of this north-south oriented hill were heavily terraced with walls. Most of the 50 foundations seemed to be of the multi-room variety, and some had quite well preserved walls showing slab facing on either side of a center area of mortar. There also were round disc stones for columns near one central group of mounds. These 16 or so mounds seemed to be clustered around at least four different plazas at four widely separated points on the top or flanks of the hills.

Tr 95. The house foundations of this linear hamlet, outlined by blocks of stone, were on a hilltop, its south flanks just north of the Rio Tilapa 600 m. north of the town of the same name.

Tr 233. This was a small hilltop hamlet on the north bank of the Rio Salado about 1.1 km. north of the Santa Cruz station and 6 or 7 km. south of Tehuacan. The small hill was about 100 m. in diameter, and included on its top were about 5 multi-room slab house foundations with many xantiles.

Tr 111. This hamlet site was located 3.3 km. northwest of Teotitlan and 2.1 km. south-southeast of Tilapa just west of the highway. It was situated on a series of low, long, flat ridges. Both the sides and the tops of these ridges had been terraced. Agricultural terraces also extended down the east part of the ridges. On the top and the side of the ridge there were about 50 house foundations, and probably many more which were buried. They seemed to be in long lines parallel to the contours of the hill and to the boulder-earth retention terraces and dams.

Tr 282. This prehistoric hilltop hamlet was 500 m. due west of Ayotla just south of Teotitlan. On the top and sides of the hill were about a dozen stone house foundations of the multi-room variety. The foundations were outlined by stone slabs and blocks, and the houses may have been of the double-walled variety.

Tr 343. This is a hilltop site and was about 8 km. southwest of Zapotitlan and 1.1 km. north of Colonia San Martín on the Tehuacan-Huahuapan highway. This hamlet was on a low hill, and there was evidence of a flint quarry at the site. Most of the site was terraced and contained, on these terraces, about 20 multi-room building foundations of flagstone. Stringing down from these house platforms on the top of the terraced hill were a whole series of agricultural terraces. Eroding out of the side of the hill were a number of ollas which had burials inside them—a new burial type.

Tr 336. This site, about 8 km. west-southwest of Zapotitlan, was located on the northeast flank of the Cerro de la Hierba. This ancient village was situated mainly on the flank, which was heavily terraced. On these terraces were many house foundations with stucco cementing in the wall slabs and mosaic flooring. Six of the apartment-like multi-room houses were very large (6 to 10 m.). Most of them had small rectangular cists in the floor of one of their smaller rooms. There were also 10 single-room foundations. One large mound of horizontal slab construction was at the foot of the hill.

Tr 453. This village site was a part of the large dam complex in the Canyon de Lencho Diego, about 2.5 km. northwest of San José Tilapa. The south side of the dam area had been heavily terraced, and on the talus slope of this large hill quite a large pyramid had been built. Construction of the pyramid and further terracing apparently occurred long after the dam was finished, when the whole dam basin had been filled in.

Tr 226. Tr 226 is about 600 m. east-southeast of Chalma, and about 3 km. south of Tehuacan. To be more

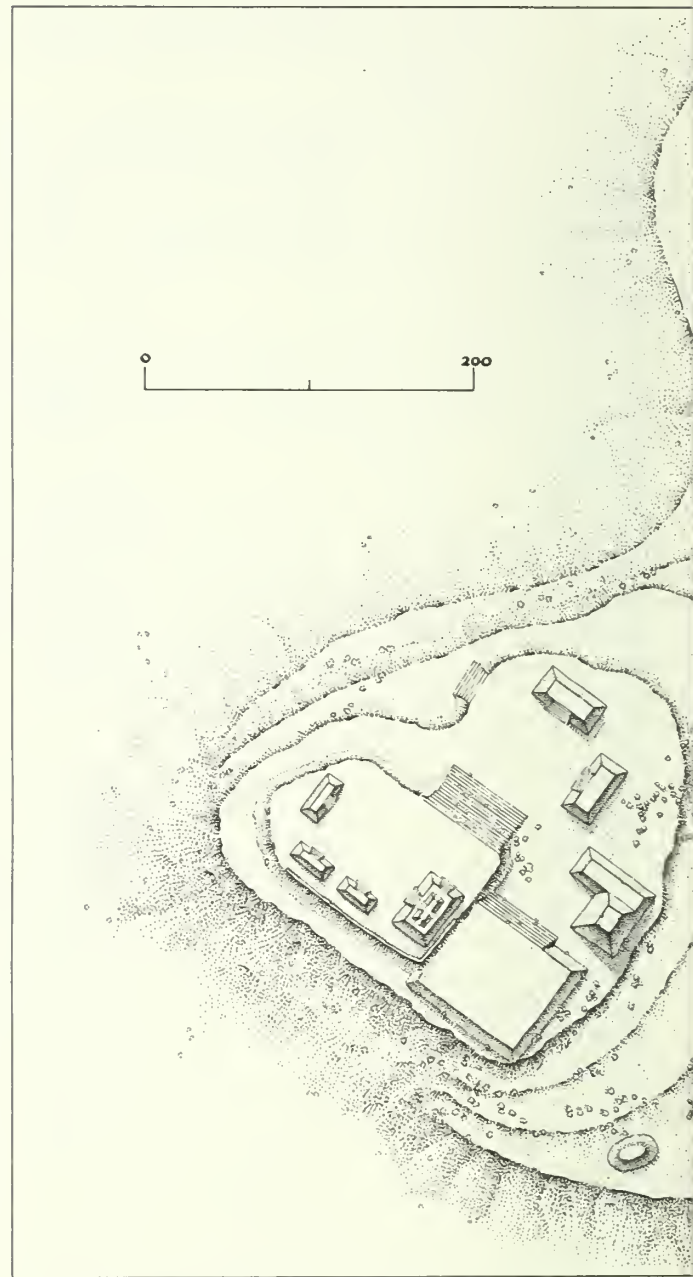


Fig. 185. Sketch map of Tr 319

specific, the village site was on the third hill to the south of Chalma, along the edge of the highway. The hill was oriented from northwest to southeast. The area had been badly looted and destroyed and robbed for building construction. There were the remains of at least one stone mound of neatly cut stone slabs, and there were parts of probably 7 or 8 multi-room slab house foundations.

Tr 140. Tr 140 was discovered in the southeast quad-



rant of the valley of Tehuacan, some 4.6 km. northwest of San José Tilapa, and 200 m. north of the village of San Rafael. It was situated on the northeastern three-quarters of the summit and flanks of the long low, northeast-southwest oriented hill, the first north of San Rafael. The dominant feature of this village was a centrally-located platform mound of earth and rubble. The second mound, of a similar construction but of a smaller size, was located a few meters to the

south-southwest of the main mound, thereby forming a plaza. At least 30 one-room house foundations of unmodified blocks of stone had been built, apparently at random, around the two mounds.

Tr 83. *Tr 83*, a nuclear hilltop town located 0.9 km. west-southwest of the town of Tilapa, was on a 300-m.-long hill oriented east and west. The site had been very heavily looted and seemed to consist of at least 75 stone house foundations of crudely-shaped blocks.

Many of the house foundations near the mounds were of the multi-room or apartment house-like variety, but a few (25) on the west end were single-roomed. There were also at least 12 badly destroyed mounds that may have been around three widely separated rectangular plazas. There were two mounds parallel to each other, which may represent a ball court, oriented north and south.

Tr 451. This site is connected with the dam complex in Lencho Diego Canyon. The ancient village was directly east of the main dam on a talus slope, which had been flattened and terraced to form the base for a large pyramid. Besides this pyramid there were 2 or 3 small single-room house foundations which seemed to be part of the Early Venta Salada reoccupation of the dam area.

Tr 319. This is the huge hilltop site that we considered to have been a city, perhaps the only city in Early Venta Salada times. Local mythology in Zapotitlan indicates that this city continued to be occupied on into colonial times; however, how much is myth and how much is fact is difficult to say. The site was about 2.5 km. east-northeast of Zapotitlan and just east of the highway which leads to Tehuacan. It covered the whole top of the mountain. The edge of the top had been fortified by a huge set of stone boulders, and the top had a tremendous complex of house foundations and temples. The house foundations were mainly on the west edge of the hill and consisted of over 100 multi-room and perhaps 78 or 80 single-room houses. Leading up the south side of the hill, or from the edge of the fortification to a series of plazas on little rises, were some huge staircases. There seemed to be at least four major plaza regions of varying elevations. One, locally called El Palacio, had four huge rectangular mounds around it, and one of these had a cruciform tomb within it, which was described in the introduction to this section. A monumental stairway led from this plaza at the highest eminence down to a lower plaza, which had at least three mounds on it. Then, north of this region, on the north spur of the hill, there was another plaza, which had at least four mounds around it. Again, the whole top of this hill was terraced with steps, wide monumental stairways leading from one leveled patio to the other. There also were a couple of ball courts, one having vertical walls of the I-shaped variety and another one formed by two parallel mounds. Both of these were oriented roughly east and west. Also, tumbled down among the refuse, were quite a number of cylindrical columns, which probably also held up the roofs of temples. Quite

frankly, our brief survey gave us only a minimal amount of information about this huge site, and some day it should be totally mapped, for it is a major ruin within the Tehuacan Valley. (See Fig. 185.)

Tr 66. This site was 1 km. directly north of Coxcatlan Cave along the flanks of a small hill. It was oriented southwest-northeast. The hamlet covered an area about 200 m. along the flank of the hill, and extended from the base of the hill up the side for about 100 meters. This side of the hill had at least three terraces, about 10 m. apart, and on them were about ten multi-room house foundations. At least three of these house foundations were composed of four rooms about 1.5 by 1.5 m., and made up a little square apartment house about 3 by 3 meters. This is a somewhat different form than we have seen before. The house foundations also were made of rock slabs, and seemed to be of the double-walled variety with mortar in between them.

Tr 44. This village site was directly east of Trinidad, about 10 km. south of the town of Tehuacan. The site was strung out across the plain, and covered an area about 300 m. in the east-west direction, and about 100 m. in the north-south direction. Most of the site consisted of amorphous earth mounds which were probably salt mounds; there were seven of these. However, we did note some (3 or 4) single-room house foundations about 2 by 4 m. in size in the east part of the site.

Tr 213. This large site was located on a huge hill in the northwest quadrant of the Tehuacan Valley, about 8.5 km. south of Tehuacan and 8 km. northwest of San Gabriel Chilac. Four main areas of construction were noted during the survey. Two were discovered atop the long narrow twin summits of the hill, and the two others were found on the spurs at lower elevations. One of these spurs was located to the east of the area between the summits, while the second was directly east of the southern summit. Evidently most of the summits of the hills were artificially flattened and enlarged through terracing, the stone retaining walls plainly visible along the western edge of each summit. Some of these walls were made up of unmodified dry-laid cobbles and boulders ranging from 1 m. to 4 m. in height, each one extending approximately 100 m. in length. Some of the taller ones looked like fortifications. The northern summit was characterized by a single, centrally-located platform mound. It had two small 2 by 3 m. house foundations on it.

About 10 multi-room house foundations of stone were represented on the two long narrow terraces con-

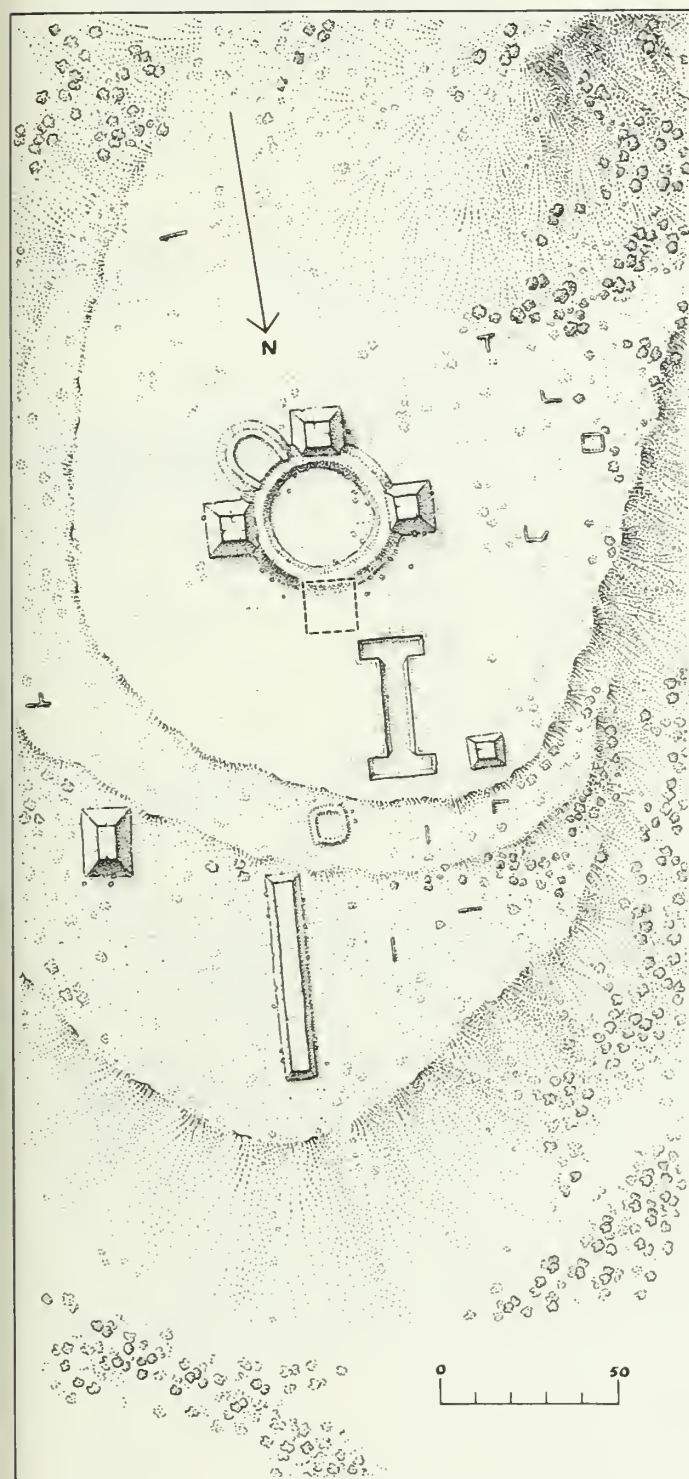


Fig. 186. Sketch map of Tr 213.

structed on the flanks of the hill to the west of the platform mound. About 500 m. to the south, on the second summit, the architecture consisted of only some undisturbed alignments of boulders and slightly modified stone blocks and slabs, apparently representing badly-disturbed house foundations or other structures. To the east of the saddle-shaped depression or dip between the two summits was located a relatively small point, or spur, of land. On the tip of this spur were found four small platform mounds arranged in a square around a plaza. A few meters to the southwest of this plaza was an oval depression. It is quite possible that this depression, which had a small axis, oriented east and west, represented a ball court. South of this spur and east of the south summit was located another much larger point or spur of land. Situated in a huge oval on the eastern and southern peripheries were four large platform mounds. They varied from 50 m. to 80 m. in diameter, and 5 m. to 15 m. in height, and were constructed of earth and rubble, apparently without any form of facing. On the northwest corner of the spur, about 300 m. due east of the south summit, was constructed a huge platform mound or pyramid, also made of earth and rubble with facing. A smaller platform mound was built extending from the west face of the mound or pyramid.

Between the very large platform mound and the south summit were two additional features. About 100 m. west of the platform mound belonging to the pyramid was a large 75 by 120 m. north-south oriented oval depression. The function of this feature was not discernible, but it may have been a very large ball court or a plaza area, or perhaps even a water-collecting basin of some type. Between this oval depression and the southern summit of the hill was situated a large I-shaped ball court constructed of dry-laid unmodified cobbles and boulders. The walls of this court were vertical. The court was approximately 35 by 100 m. in size; its long axis oriented in a north-south direction.

In addition to the major architectural construction mentioned, we found many small terraces constructed on the upper flanks of the hills. These terraces had dry-laid boulder facings and ranged from 2 by 3 m. to 5 by 15 m. in size. Many of the 30 or 40 single-room stone house foundations noted, averaging about 2 by 3 m., were found on these terraces, but some of these artificially flattened areas may have served as plazas as well. (See Fig. 186.)

Tr 370. Tr 370 hamlet was centrally located within the valley, approximately 1.3 km. west-northwest of the town of San Gabriel Chilac. An area of about 50 by

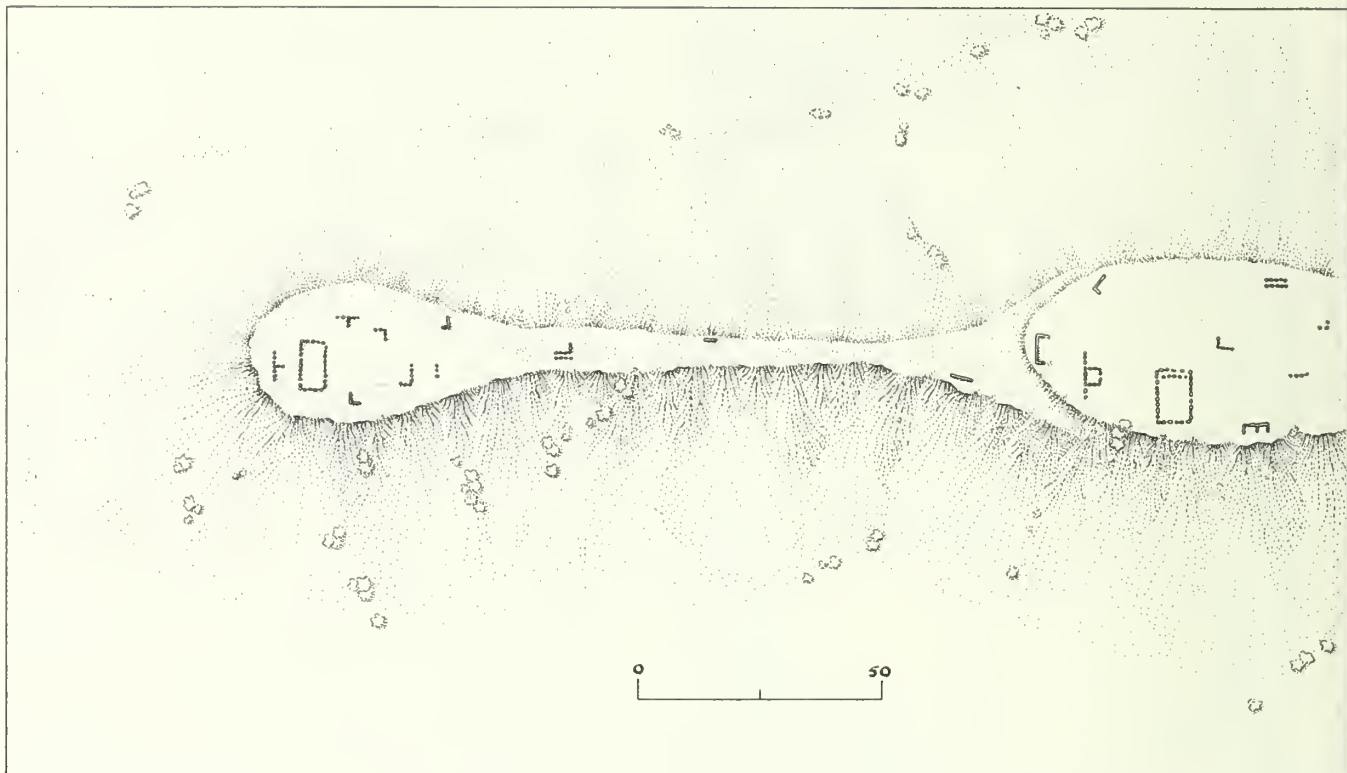


Fig. 187. Sketch map of Tr 1.

50 m., the site was situated on the floor of the valley. Although a few scattered alignments of stones, obviously belonging to house foundations, were found, they were so fragmentary that an estimate as to the size and number could not be ventured. The surface collection exhibited ceramics, suggesting an Early Venta Salada date for these fragmentary structures.

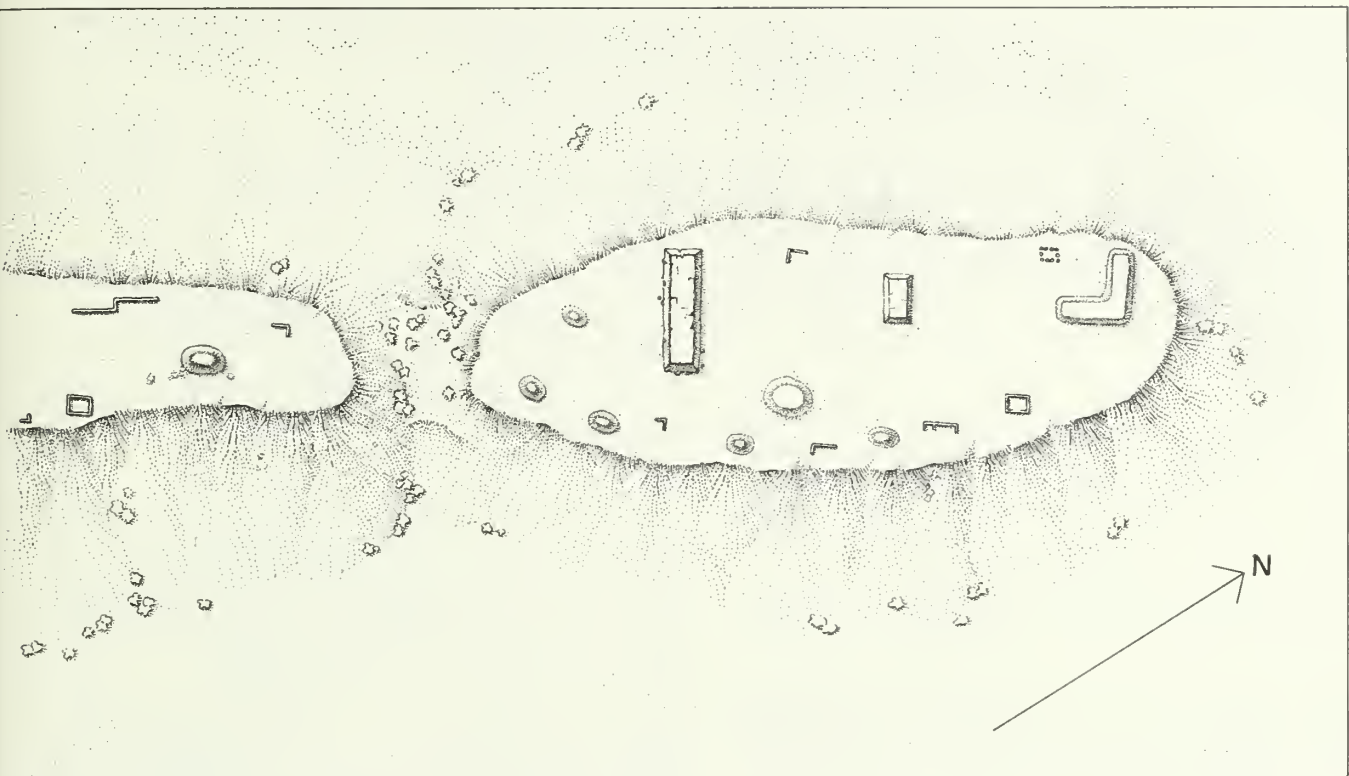
Tr 379 is described above.

Tr 293. This hamlet was discovered in the state of Oaxaca, just southeast of the valley of Tehuacan, about 2.5 km. south of San Martín Toxpala and 3 km. north of Los Cues. It was situated on the northwest, west, and southwest flanks of a roughly conical hill. Architectural features consisted of several artificially terraced areas or field borders along the southwest flank of the hill, and remnants of a few stone structures that had been constructed on each of these terraces. The foundations and low walls bordering the terraces were of dry-laid unmodified boulders, and the foundations seemed to be of the multi-room type. Heavy erosion had damaged and evidently obliterated much of the architecture. A large rock shelter located in the southwest flank, and small shelters and caves in the west and

northwest flanks, may well have served as habitation and storage areas. A small mineral stream at the base of the hill in the northwest was probably used as a source of potable water.

Ts 414. This hamlet is an irrigation feature site, found along both sides of the arroyo just west of the Tehuacan-Huahuapán highway at Km. 18.9. It was actually about 2.5 km. northeast of Zapotitlán and 5 km. south-southwest of Texcala. The open site consisted of linear field borders, terraces, and dams constructed at right angles to the flow of the sheet wash and the intermittent stream. About four linear bordered areas (10 by 30 meters) were built for retention of sheet wash in the northeastern corner of the site. About ten terraced dams (1 to 2 m. high and 20 to 40 m. long) were further down stream.

Tr 145A-B. Located in the southwest section of the valley, some 800 m. southeast of San Antonio Nahuatipán and 5.3 km. west of Teotitlán del Camino, Tr 145 was situated along a bifurcated summit of a long, narrow hill oriented northeast by southwest. Remnants of architecture were found scattered over nearly the entire 6 to 60 m. wide by 550 m. long area.



Architecture on the southwest portion of the hill (145A, a village site) consisted of only 17 stone-founded structures.

Upon crossing the natural dip or "saddle" north of the northeast summit of the hill, the picture changes somewhat. Here, at Tr 145B, small, low, earth salt mounds were the predominating architectural features, while stone foundations were present in lesser numbers. (See Fig. 187.)

Tr 337. Located on the Cerro de la Hierba flank a half kilometer southwest of Zapotitlan were 8 multi-room house foundations and many hillside terraces, covered with great quantities of flint and chipping debris.

Tr 340. On top of Cerro Lamosa in the travertine slopes between Zapotitlan and Colonia San Martín was a single mound of rocks and about 4 multi-room house foundations; the side of the hill had a series of terraces on it.

Salt Industry Sites

Tr 189. This was a huge area of salt mounds about 800 m. south of Rio Zapotitlan and 800 m. west of the Rio Salado. The mounds were in and around a marshy

area with a number of salt springs. Salt pans and much of the low marshy plaza-like area between the mounds may have served for salt evaporation. There were many clay salt prongs to support the salt pans.

Tr 221. About 1 km. north of San Marcos situated on the grass plains was Tr 221, a line of salt mounds running roughly north-northeast to south-southwest.

Ts 320. This site was situated on the north bank of the Rio Zapotitlan, about 5 km. downstream from the town of Zapotitlan Salinas. It covered a huge area along the edge of the bank. On top of many of the salt mounds were box-like structures of stone slabs, indicating that they probably served as filtering mechanisms. There were also some square drying bins for salt on the site. This is still a prominent salt-working industry area, and some of these salt mounds may have been used up to historic times.

Tr 151. This salt hamlet was situated on the left west bank of the Rio Salado about half way between the entrance of the Barranca de los Mangos and the Rio Comulco, directly across the river from Cerro Colorado. What appeared to be house foundations had been

badly disturbed by cultivation. Perhaps the most surprising aspect of this site was an apparent ball court surrounded by four mounds. The rectangular plaza of the ball court was oriented east and west, and the ball court was made of slab masonry.

Tr 208. Centrally located in the valley, this salt production site was approximately 7.4 km. west of Calipan and 3.6 km. south of San Sebastian Zinacatepec. The railroad from Tehuacan to Oaxaca cuts through the site at Km. 170.84. *Tr 208* mounds are situated on the valley floor.

Ts 59. This was an open site covering an area of about 40 by 50 m. It was on the west side of the Zapotitlan Valley, about 1 km. south-southwest of San Antonio Texcala. Three amorphous mounds indicate that it probably was a salt working site.

Tr 209. This was a huge area of salt mounds on a flat plain about 3 km. north of San Jeronimo.

Tr 128. This site, on the west bank of the Rio Salado, 1.5 km. directly west of Puebla Nueva, was strung out over an area about 1 km. long, and it extended back as far as 300 m. from the river edge.

Tr 5. This was a large group of mounds on the flats, about 2 km. northwest of San Andrés and 1 km. north of the highway leading from Tehuacan to Chilac; in actual distance it was 8.2 km. northeast of Chilac itself.

Tr 188. This site was on the west bank of the Rio Salado about 2 km. northwest of Puebla Nueva. It consisted of about 30 to 40 amorphous salt mounds and little else.

Tr 246. Centrally located in the valley, *Tr 246* was 4.5 km. southeast of Altepexi and 1 km. west-northwest of San Sebastian Zinacatepec. It was situated on the valley floor and consisted of a single mound.

Tr 284. *Tr 284* was found in the southwest section of the valley, approximately 2.8 km. southwest of the village of San Rafael and 4.3 km. northwest of San Antonio. This large salt production site was situated on the floor of the valley.

Tr 199. *Tr 199* was discovered in the southwest quadrant of the valley, 7.2 km. south-southwest of Axusco and 5.6 km. northwest of San Antonio Nanahuatipan. Architecture having to do with salt rendering was situated on the valley floor. Associated structures, presumably dwellings, were constructed on the summits and flanks of small hills bordering the site at *Tr 196*.

Tr 55. This series of salt mounds was on the north bank of the Rio Calapilla about 2 km. above its junction with the Rio Salado.

Tr 168. This salt hamlet, 500 m. east of Axusco and just west of the exit of the pass between Cerro Tluchica and Cerro Portezuelo, was composed of many salt mounds and a few house foundations.

Tr 192. This salt hamlet was described in the notes as a "sea of mounds." It was located in the center of the valley halfway between Axusco and Cerro Petlanco.

Tr 145B. This salt hamlet was about 2 km. east of San Antonio Nanahuatipan on a hill just east of the village site *Tr 145A* described above.

Tr 119. This site was on a small hill on the west bank of the Rio Salado just north of the junction of the Ajuereado Arroyo, 1.1 km. west-southwest of the town of San Rafael. This hamlet was on a small hill oriented north-south and was composed of house foundations surrounding a series of salt mounds.

Tr 122. *Tr 122* was 2.1 km. west of the town of San Rafael on a small north-south oriented hill just west of the Rio Salado. About 7 or 8 house platforms of the multi-room variety were spread out over the hill. The most interesting aspect of this small hamlet was the two rectangular tombs, which had been looted. These tombs were about 50 cm. wide, 1.6 m. long, and only about 15 cm. deep, lined with stucco and plaster, and with large slabs that once had covered them. Three or four amorphous salt mounds were located around one flank of the hill.

Tr 127. This salt hamlet was situated 3 km. southwest of Pueblo Nuevo on the east bank of the Rio Salado. The site itself was on a long, low hill oriented north-south.

Tr 198. In the southwest portion of the Tehuacan Valley, *Tr 198* was located about 500 m. southwest of *Tr 199* (see above), 7.4 km. south-southwest of Axusco, and 5.6 km. northwest of San Antonio Nanahuatipan. It was found to be quite similar to site *Tr 199*, the only difference being in the size; *Tr 198* was slightly larger and had a number of canals to bring saline flows.

Tr 197. This hamlet was another salt site, about 1.5 km. south of the small hill called Petlanco and only about 1 km. from the Rio Calapilla. There were many salt features as well as linear borders and soil dams but little direct evidence of house foundations.

Tr 196. Discovered in the southwest section of the

TABLE 38
Early Venta Salada Seasonality Data

		Tc 35e, C	Tc 255, A	Tc 50, III, A-B	Tc 35e, B-3	Tc 50, II, A	Tc 50, II, B	Tc 36	Tc 3	Tc 46	Tc 64	Tc 261	Tc 239	Tc 35, layer 2
MICRO-ENVIRONMENTS														
	El Riego Oasis	X			X			X						X
	Travertine Slopes													
	arroyo flanks		X							X		X		
	Valley Center Steppe													
	humid river flanks								X					
	steppes												X	
	Alluvial Slopes													
	valley flanks			X		X	X				X			
SEASONALITY														
Fall	CIRUELA FRUIT	X		X		X	X							
	CHUPANDILLA FRUIT	X		X	X	X	X							
	AVOCADO FRUIT	X		X	X		X							
	Beans	X		X	X									
Summer	SAPOTE FRUIT	X	X	X	X	X	X							
	Cucurbits	X	X	X	X	X	X							
	Corn seed	X	X	X	X	X	X							
	LIZARD	X		X	X	X	X							X
Spring	Turtle	X												
	Peppers	X			X	X								
	Amaranth seed	X		X		X	X							
	Mesquite seed	X	X	X	X	X	X							
Winter	Grass seed	X		X	X		X							
	Setaria seed	X		X			X							
	Leucaena seed		X	X	X	X	X							
	Pochote seed	X		X	X	X	X							
Fall	TETECHU FRUIT	X												
	COYOL FRUIT	X		X	X	X	X							
	COSAHIICO FRUIT	X		X	X		X							
COMPONENT DIMENSIONS														
	length in meters	4	5	20		14	9	8	10	25	19	21	6	
	width in meters	5	5	4		3	5	6	5	2	2	3	2	
	extent in sq. meters	21	25	80	62	40	40	48	50	50	38	63	12	
SETTLEMENT FEATURES														
	bark cloth pit	1												
	cache pit	2			?									
	burial pit (cremation)	1												
	roasting pit	3		1	3	X	X							1
SETTLEMENT PATTERN TYPES														
	Macroband all-season camps				X									
	Microband all-season camps	X						X						X?
	Microband multi-season camps													
	spring-summer						X							
	summer-fall			X		X								
	Microband wet-season camp		X											
	Microband dry-season camps									X	X	X	X	
	Microband dry-season water-source camp								X					

TABLE 39
Early Venta Salada Specialized Sites

[illegible]

T A B L E 40
Early Venta Salada Salt Industry Sites

	Tr 189	Tr 221	Ts 320	Tr 151	Tr 208	Ts 59	Tr 209	Tr 128	Tr 5	Tr 188	Tr 246	Tr 284	Tr 199	Tr 55	Tr 168	Tr 192	Tr 145B	Tr 119	Tr 122	Tr 127	Tr 198	Tr 197	Tr 196	Tr 81	Tr 56
<i>with associated habitation (salt hamlets)</i>				X						X					X	X	X	X	X	X	X	X	X	X	X
MICRO-ENVIRONMENTS																									
Travertine Slopes			X			X																X			X
arroyo flanks																									
slopes																									
Valley Center Steppe																									
steppes	X	X		X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X				
hilltops																		X	X	X	X				
SITE DIMENSIONS																									
length in meters	1 km.		500	50	250	1 km.	1 km.	1,000	150	1,000						600		300		120		400		40	100
width in meters	1 km.		600	20	250	1 km.		300	150	500						500		150		40		100		35	50
extent in sq. meters			300,000		62,500		300,000	22,500		500,000						300,000		45,000		4,800		40,000		1,400	5,000
FEATURES																									
salt mounds	200	20	40	50	10	3	40	50	20	40	1	5	200	8	60	50	10	X	X	10	40	30	70	7	X
bins			20										X		X	4	X		100		X	X	X	X	X
canals												5				2					X	X	X	X	X
filtering plant			X																						
dams																2					X	X	X		
legs			X	X	X	X				X			X		X	X		X							
house foundations	X																	X	X						
mound										40						5	15	X	X		5	X	10	1	X
ball court				X													X								

Tehuacan Valley, this salt hamlet was about 6.8 km. south-southwest of Axusco, and 6.3 km. northwest of San Antonio Nanahuatipan. Tr 196 was situated on the valley floor, and the small low hills nearly encompass the site.

Tr 81. This salt hamlet was 3 km. directly west of Tilapa and 80 m. northeast of the Aldama railroad station. A series of nine to ten low amorphous mounds and a couple of possible single-room house foundations were located on both the plains and some of the very small hills to the south.

Tr 56. Tr 56 was directly west of San Antonio Nanahuatipan on the east bank of the Rio Calapilla. The hamlet covered an area about 100 m. long along the river and extended back about 50 m. from the river edge. There were 4 house foundations on this site and a number of salt mounds.

Irrigation Sites

Ts 414 is described above and in Volume 4.

Tr 393. This site was a huge aqueduct running along Xiquila Canyon. It has been described by Woodbury and Neely in Volume 4.

Tr 415. This is another irrigation site described by Woodbury and Neely, located just northeast of Zapotitlan, at Km. 22.75 on the Tehuacan-Huahuapan road. It was on the west side of the road and ran from the road to the foot of a high hill just northeast of town. This hill flank site had been artificially terraced and outlined by rock and definitely had field borders for cultivation and for irrigation.

Ts 332. This was a hill flank site, terraced for agriculture, on the hill directly north of the town of Zapotitlan, and was described by Woodbury and Neely in Volume 4.

Tr 424. This was a site of field borders and high and low terraces for agriculture, located about 8 km. southwest of Zapotitlan, 2.3 km. west-northwest of the Colonia San Martín, on the eastern flanks of the Cerro Castile. The materials have been described by Woodbury and Neely.

Tr 336. This set of hillside terraces was also about 8 km. west-southwest of Zapotitlan on the northeast flank of the Cerro de la Hierba, and has been described by Woodbury and Neely.

Tr 210, Tr 21, Tr 228, Tr 454, Tr 341, Tr 42, Tr 288, Tr 111, Tr 343, Tr 319, Tr 213, Tr 413, Tr 418, Tr 197, Tr 337, and Tr 340 are described above.

Stratified Sites

Tc 35e is described in Chapter 2.

Tc 255 is described in Chapter 4.

Tc 50 is described in Chapter 6.

Tc 36. This was a cave in the El Riego section just north of Tehuacan, about 100 m. northeast of the Tc 35 excavations and surface collections. In it were revealed Early Venta Salada remains as well as a number of burials.

Tc 3. This was a small cave directly east of the town of Tehuacan on the small cliff above the west bank of the Rio Salado, just below the plain and hill flank that contains Tehuacan Viejo. Much of the cave had been cleaned out by goatherders living in it.

Tc 46. This site was the farthest west of our Early Venta Salada sites, about 2 km. east of the turnoff to Tequixtepec in Oaxaca, just north of the Tehuacan to Huahuapan road. This large shelter was tested in 1961.

Tc 64. This was a small cave, 2 km. directly north of Coxcatlan Cave. We put a small test in this cave, and all we turned up in the rock fill were sherds of early Postclassic type.

Tc 261. This site was in Tecorral Canyon north of San Marcos and was about 1 km. north of the site we excavated, Tc 254. The shelter contained a few early Postclassic sherds. There were a few field borders on the terrace below the cave.

Tc 239. On the cliffs directly west of Altepexi there were about a dozen small caves, but only the second one from the east had sherds in it of Early Venta Salada types, and this was given the site no. Tc 239.

Indeterminate Occupations

Tr 369 (Early Santa Maria Phase) is described above.

Tr 243, Tr 67, and Tr 212 (Late Santa Maria Phase) are described above.

Tr 102, Tr 251, Tr 73, Tr 186, Tr 300, Tr 180, Tr 304, Tr 302, Tc 6, Tr 143, Tr 106, Tr 146, Tc 13, Tr 232, Tr 84, Tr 234, Tr 109, Tr 103, Tr 90, Tr 179, Tr 183, Tr 280, Tc 10, Tc 9, Tr 175, Tr 89, Tc 34, Tr 169, Tr 153, Tr 144D, Tr 76, Tr 131, Tr 214, Tr 205, Tr 356, Tr 303, Tr 217, Tr 301, Tr 364, Tr 207, Tr 173, Tr 152, Tc 11, Tr 48, Tc 8, and Tr 74 (Early Palo Blanco Phase) are described above.

Tr 47, Tr 171, Tr 174, Tr 258, Tr 346, Ts 321, Tr 317A,

THE ARCHAEOLOGICAL RECONNAISSANCE

Tc 124, Tr 133, Tc 30, Tc 257, Tc 33, Tc 200, Tc 295, Tr 223, Tr 172, Tr 342, Tr 118, Tr 23, Tr 344, Tr 116, Tr 38, Tr 419, Tr 421, Tr 52, Tr 416, Tr 351, Tr 105, Tr 276, Tr 422, Tr 413, Tr 420, Tr 247, Tr 305, Tr 147, Tr 99, Tr 43, Tr 117, Tr 278A, Ts 455, Tr 176, Tr 92, Tr 227, Tr 100, Tr 417, Tr 299, Tr 335, Tr 306, and Tr 240 (Late Palo Blanco Phase) are described above.

Tr 155, Tr 190, Tr 162, Tr 285, Tr 134, Tr 154, Tr 57, Tr 53, Tc 18, Tr 120, Tr 94, Tr 78, Tr 184, Tr 326, Tr 1, Tr 126, Tr 129, Tr 135, Tr 160, Tr 163, Tr 166, Tr 167, Tr 187, Tr 191, Tr 286, Tr 294, Tr 211, Tr 216, Tr 220, Tr 231, Tr 238, Tr 242, Tr 244, Tr 245, Tr 324, Tr 339, Tr 357, Tr 80, Tr 165, Tr 62, Tr 139, and Tr 75 (Late Venta Salada Phase) are described below.

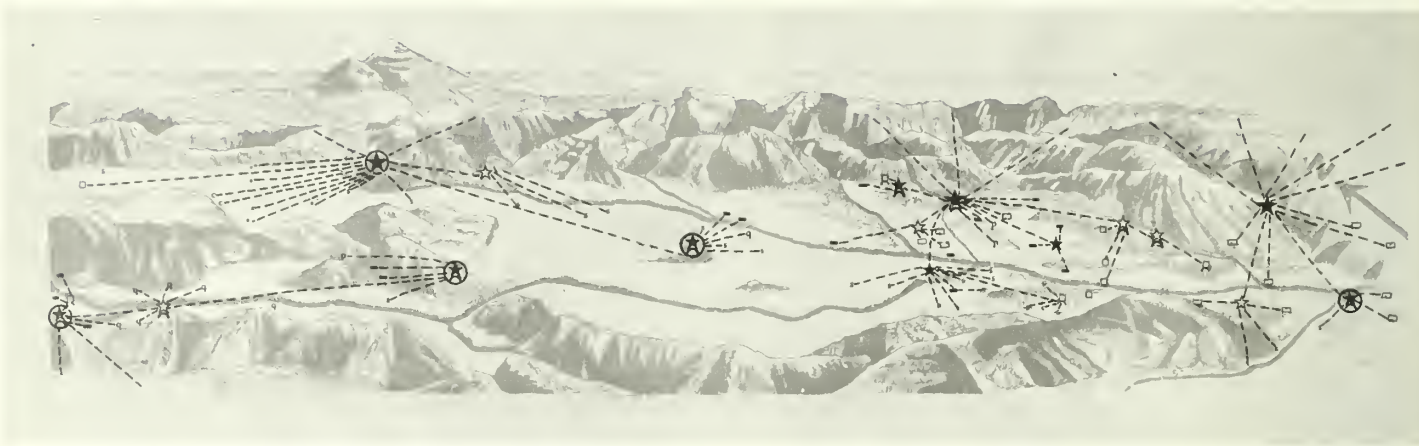


Fig. 188. The reconstructed Late Venta Salada settlement pattern in the Tehuacan Valley.

The Late Venta Salada Settlement Pattern

In the initial survey 87 occupations, 21 specialized sites, and about 103 indeterminate occupations were discovered that pertained to Late Venta Salada, roughly 1150 to the historic period. Now, our Coxcatlan Project under the direction of Edward Sisson, then of the R. S. Peabody Foundation, has netted an additional 100 or so sites of this subphase. Further, as noted in Chapter 6, he excavated or tested a number of sites of this period in the Coxcatlan region. Upon his completion of the analysis of these materials, our knowledge of the subphase should be greatly augmented. However, at the time of the writing of this chapter, neither these materials nor the proposed crucial ethno-historical studies are such that we can do more than allude to them, and thus we are forced to rely upon the earlier survey and test pit data.

One obvious difference between the settlement pattern of Late Venta Salada and that of the earlier subphase is the presence of three cities: Coxcatlan (Tr 62), Teotitlan del Camino (Tr 115A), and Tehuacan (Tr 1). Whether or not these are "cities" is open to debate, but, in our classification, they certainly had a number of characteristics not found in our towns, and some of these we consider to be of an urban nature. All three of them occupied a similar environmental position in that they spread over a series of ridges on the flanks of the Sierra Madre in the Alluvial Slope thorn forest eco-zone and occupied strategic spots at the foot of the passes leading out of our valley to the east. Further, on top of each of these ridges at Teotitlan del Camino and Coxcatlan, there are small ceremonial centers with 2 to 4 pyramids around a plaza with a

central platform, as well as multi-room house structures at the sides of the plazas. Tehuacan is only slightly different in that the ceremonial centers are at the foot of the ridges above a small northern cliff, but the general pattern is still similar. Although we never adequately mapped this site, there seem to have been between 12 and 16 such barrio ceremonial centers oriented toward a major city center, with 2 to 4 nested plaza groups surrounded by pyramids on all sides. Teotitlan is even more difficult to reconstruct, for the present town covers some of the barrio ridges and probably the central plaza or nested plaza, but, along the Huautla road above the town, between 12 and 16 ridge-top ceremonial centers may be seen. Coxcatlan, which Mr. Sisson has investigated more thoroughly, has at least 10 ridge-top ceremonial centers, and then 2 major plaza areas with many surrounding pyramids adjacent to each other below the ridge, as well as 2 other nested plaza groups nearby, west across the present arroyo. Such plaza groups suggest that there were many full-time specialists connected with perhaps ceremonial, administrative, and executive matters in each center or barrio of each of these cities. However, more important than the many ceremonial and/or administrative centers was the fact that slopes of each of the ridges were terraced, and on each terrace were many rectangular multi-room houses of the type described previously at Tr 62 and Tr 65. Further, Sisson's excavations of these sites suggest that many of the structures were the homes or factories of full-time specialists in flint-knapping, weaving, and the mass production manufacture of pottery in molds (and per-

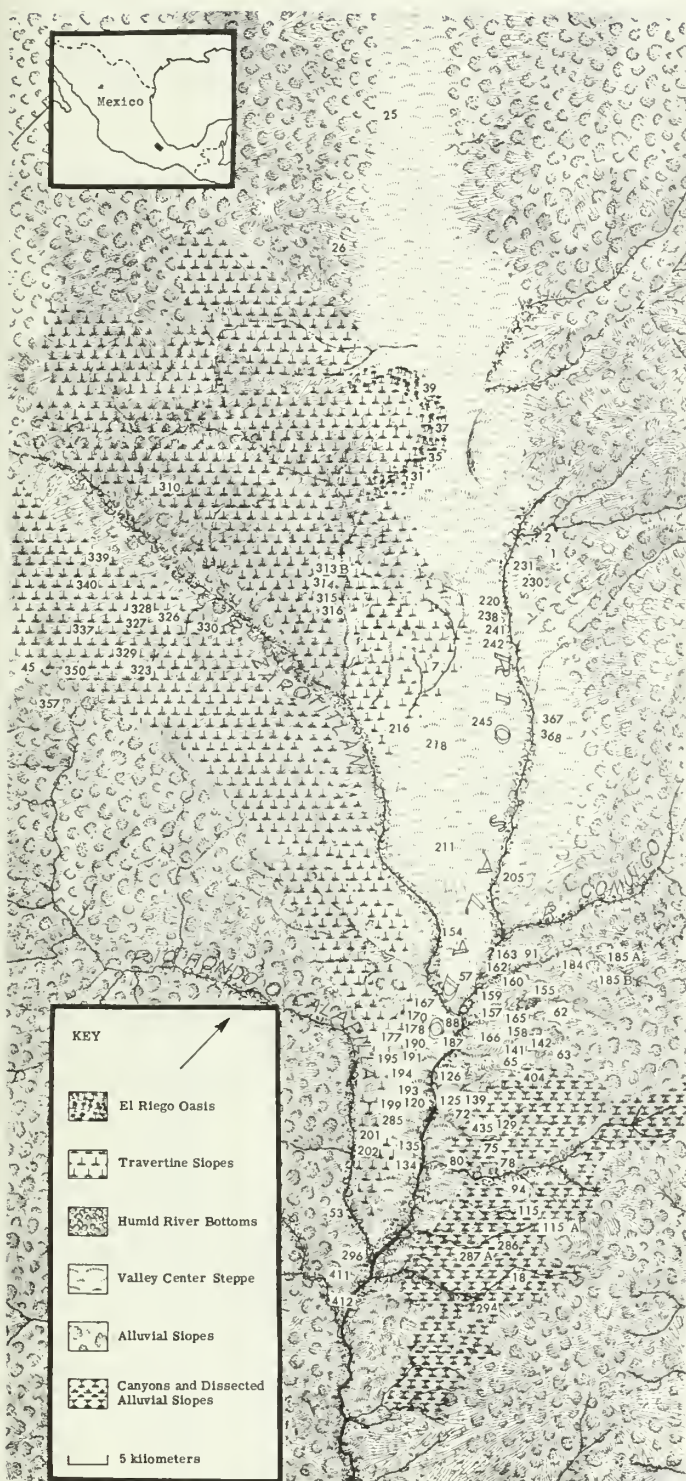


Fig. 189. An ecozone map of numbered Late Venta Salada sites in the Tehuacan Valley.

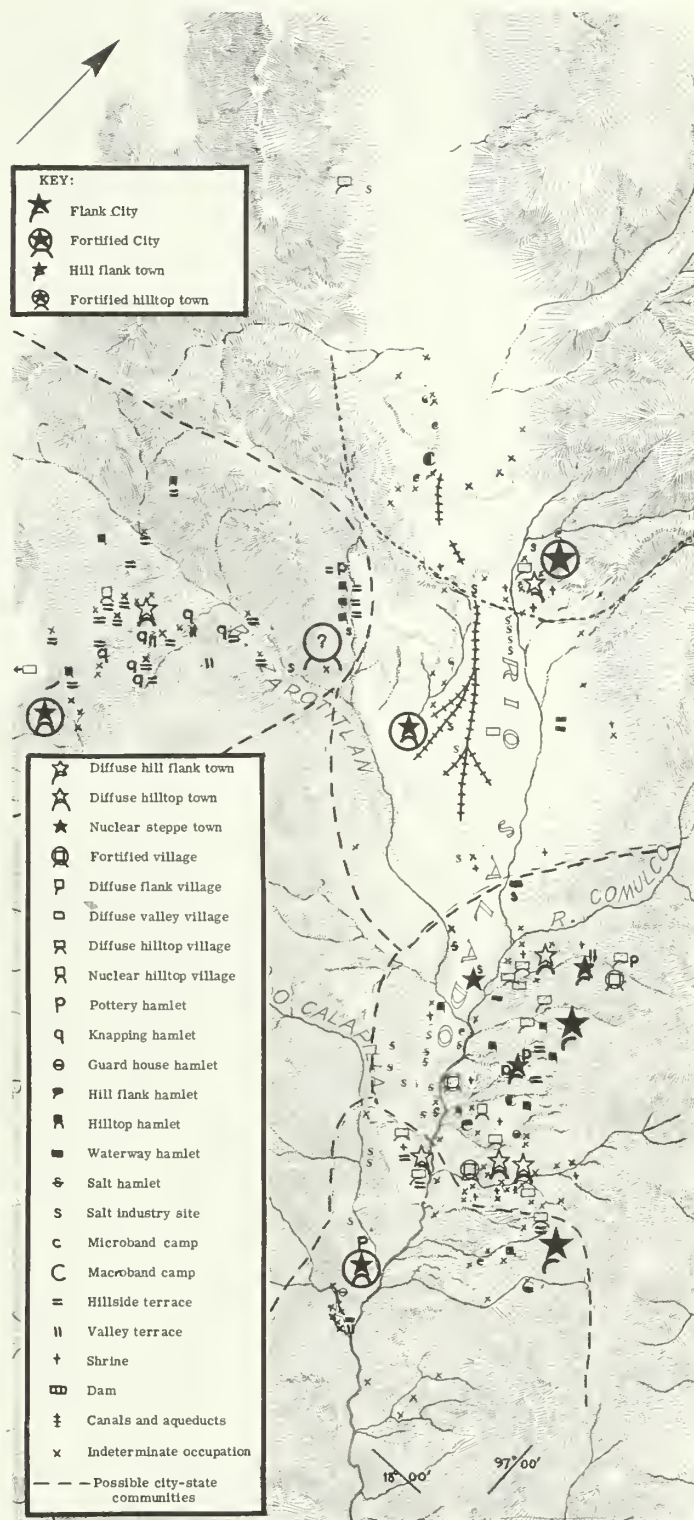


Fig. 190. Map of Late Venta Salada settlement pattern types in the Tehuacan Valley.

haps also salt, and many other crafts). All in all, it is our impression that a large proportion, if not the majority, of the population in these cities were full-time specialists. This hypothesis will be further tested by Sisson's analysis of his excavated materials.

However, besides having these prime characteristics of cities, ethnohistoric information reveals that Coxcatlan, Tehuacan, and Teotitlan were also capitals of small city-states, and thus were the religious and political centers for a number of surrounding settlements of various types, as well as centers of commerce both internally and externally. Besides these other urban traits, the differences in size of structures suggests that a stratified society, perhaps of a hierarchical nature, lived in these cities. In fact, in many of these excavated houses, one room contains many xantil fragments, suggesting that perhaps the occupants were of specific noble lineages with specific household gods. Analysis of these materials should do much to test this hypothesis, and it also may determine if specific barrios or towns or hamlets or crafts were connected with certain gods or lineages with certain gods or if various lineages partook of each of the above. The other characteristic often considered in determining if the settlement is a city is the size of its population. Tr 1, Tr 115A, and Tr 62 are larger than most of our towns or other sites, but small in comparison with such ancient cities as Teotihuacan, Cholula, Monte Alban, etc. Nevertheless, we still would classify our sites as cities, albeit mini-cities, for they have the other more important characteristics of urbanism.

Besides these cities, there is the possibility that Tr 319 with its fortification was still being occupied, so perhaps our valley had a fourth city of historic times; but it may also have shrunk to a town at this period with less numbers of full-time specialists, less class differentiation, and no longer a commercial, administrative, or political center. Excavation has, however, revealed that some of our towns, such as Tr 57 and Tr 65 did, however, have some full-time specialists, and these, like two others, were in hill flank positions. Besides the multi-room houses, there were proportionately more linear or single-room houses, suggesting that the majority of the population were not full-time specialists. Also, there is no evidence that they were political or commercial centers. Further, the pyramids around the plaza areas were not spectacular, nor were they either nucleated or in any hierarchical order of importance. These towns are relatively close to our larger cities and may have been beholden to them in terms of kinship and tribute. Although our ethnohistoric data is more inadequate, there is some possibility

that they are ancestral to the historic towns of San Antonio Nanahuatipan (Tr 135), San Mateo Tlacoacalco (Tr 61), San Diego Chalma (Tr 230), and Calipan or Comulco (Tr 184).

Equally numerous were the hilltop towns whose undifferentiated plazas were scattered over the tops of the hills. There is little evidence of full-time specialists. Possibly Tr 328 was the beginnings of historic Teloxtoc, Tr 91, Calipan or Comulco, and Tr 78 and Tr 75, Tilapa. Like the two examples of diffuse hilltop towns of Early Venta Salada, these four Late Venta Salada examples seem oriented toward large areal centers.

Three fortified hilltop towns are equal in number and importance to those of Early Venta Salada. Tr 319, a city in Early Venta Salada, is a fourth representative of this type. Fortifications enclose large plaza areas of large structures with columns and monumental staircases. There was little evidence of specialization, other than the possibility of obsidian blade manufacture at Tr 216 and Tr 357 where there were many flint tools. These Late Venta Salada towns are probably ancestral to the historic towns of Acatepec (Tr 357), ancient Chilac (Tr 216), and San Francisco de Coyolapa or Coyallen (Coyula or Los Cues) (Tr 296), a subject town of Teotitlan del Camino.

Valley towns, a type fairly numerous in the early part of the Venta Salada Phase, is now represented by only one site. Tr 57 has ample evidence of full-time specialists in salt-making, blade-making, and possibly textile manufacture. Whether this site is the town of Axusco or Jeronimo Axochitlan of historic times is difficult to decide. In the nuclear hilltop towns, we see the final gasp of the dominant Palo Blanco settlement type in Early Venta Salada. It does not occur at all in Late Venta Salada times.

While the significant differences in the settlement pattern for towns were qualitative, perhaps representing social changes, the pattern for villages in the two subphases is similar and only quantitatively different. Late Venta Salada has seven diffuse hill flank and five diffuse hilltop villages, while Early Venta Salada has four and nine respectively. Diffuse valley villages also occur in both subphases, as do fortified villages. While the latter seem to be more numerous in Late Venta Salada, their custom of using large boulders for the top terrace makes our classification of some Late Venta Salada fortified sites (Tr 94 and Tr 126) extremely tenuous, although, of course, a high terrace may have made the sites just as defensible as high walls.

The only settlement type in Late Venta Salada that

T A B L E 41
Late Venta Salada Settlement Pattern Data

[illegible]

Table 41 continued on reverse side

Table 41 (continued)

did not occur in Early Venta Salada are nuclear hilltop villages. Both the Late Venta Salada examples are very small sites that have a concentric arrangement only because of the limited topography of the hilltops themselves. Of all the nineteen Late Venta Salada villages, only four stand out from the other villages of this and the previous period. These four village sites have evidence of specialized activities. Ceramic molds at Tr 185A indicate the possibility of a ceramic industry. Tr 245 has spindle whorls, many blades, cores, and obsidian chips, and flint tools, indicating possible textile and flint-knapping industries, while artifacts and refuse found at Tr 139 and Tr 340 indicate a major occupation in flint-working.

The hamlets also show a tendency towards increasing specialization. Nine are salt hamlets, three sites have evidence of pottery making (Tr 141, Tr 142, and Tr 313), and some of working in textiles (Tr 329 and Tr 367 as well as Zone A of the cave, Tc 35). At ten hamlet sites flint-knapping and/or quarry activities took place. From many standpoints, these sites are much like the town barrios with their specialized activities. However, still numerous are sites without evidence of specialization, possibly hamlets involved in farming like those of the previous ceramic subphases. Besides the difference in function, there was a shift in their locations. The dominant type (14 of 40 examples) of Late Venta Salada hamlets are located on the flanks of hills or valleys, increasing in number at the expense of the hilltop hamlets, now only three, which were dominant (12 examples) in Early Venta Salada. Other types of hamlets, like waterway hamlets, fortified hamlets, and salt hamlets on the steppes, showed little change.

All in all, there has been a noticeable increase in residence sites from early to late Venta Salada times: cities, 1 to 3 or 4; villages, 18 to 19; and hamlets, 32 to 40, or a total increase in residence sites from 77 to 87. Further, the number of house foundations has increased from about 1,455 to 3,396, with the many more rectangular multi-room houses in Late Venta Salada, 339 to 1,129. This increase is proportional to that of the number of square meters occupied by residential sites, 3,828,400 for Early Venta Salada and 9,556,750 for Late Venta Salada. There seems to be little doubt that the population had greatly increased from early to late Venta Salada times, and perhaps tripled. What this means in terms of exact numbers of people is difficult to determine. More refined ethnohistoric data will eventually allow us to do something better than just guess. The best data now for estimating the population of our surveyed area, available from Cook and

Simpson (1948), is for the period about 1565. For the northern part of our survey area, we have population figures of 10,406 for Tepanco; 10,862 for Tlacotepec; 12,627 for Tehuacan; and 1,200 for Chapulco: a total of 35,095. The western cluster of our surveyed area may be represented by the figure for Zapotitlan, 8,400, while in our central area the figures for Coxcatlan and Axochitlan (Axusco) are 1,870 and 4,218 respectively. For the southern area, we have estimates of 4,009 for Teotitlan del Camino and 2,100 for Nanatiquipac Huautla. Obviously, these population figures are not for these specific towns or sites. The maps of 1580 and the Relaciones de Coxcatlan show Tilapa, San Jeronimo Axotilco, Axusco, San Pedro Otonopeque Comulco, Calipan, and San Mateo Tlacoaxcalco in our central surveyed region, as well as Coxcatlan and Axochitlan. The map and Relaciones de Teotitlan would show more towns than Teotitlan and Nanatiquipac. Further, the *Epistolario de Nueva España*, Vol. XIV, would have Ajalpan and Chilac listed for our northern area and Acatepec in our western zone. Further, when one compares the population estimates with the number of archaeological sites or ethnohistoric towns, there are some obvious discrepancies. Of the four units in our survey area the least number of sites occur in the northern Tehuacan zone, which has the largest population (34,095), and the central Coxcatlan area, with the greatest number of sites, has the smallest population (6,088). There may be three possible reasons for these discrepancies: 1) there may have been considerable shifting of populations in the valley due to Spanish pressures, 2) our survey of the northern area is inadequate, or 3) the 1565 population figures are inaccurate and other ethnohistoric data inadequate. Probably all three reasons pertain, but, be that as it may, we do have a figure of 55,692 people for our survey region for 1565, and, considering the population trends in other parts of Mexico after 1520, this must be considered an absolute minimum figure for the population at the time of the Conquest. Earlier, MacNeish guessed the figure to be closer to 100,000; but, as Byers noted, he may have been too conservative. Pending better ethnographic data, we will stick with roughly this estimate; that is, $100,000 \pm 20,000$. This would mean about a three-fold growth in population since Early Venta Salada times. This sort of an increase is consistent with the archaeological data; thus, while our population figures may be wrong, we believe our population trends are not far off the mark.

Besides the changing trends in settlement patterns, demography, and population, the architecture of Late Venta Salada reflects the further development of the

architectural innovations of Early Venta Salada. House structures were larger and more ornate, construction consisted more of stucco and adobe rather than cut slab masonry, and the use of columns, large flanking terrace walls, and stairways increased. In his present study of the Postclassic, E. Sisson is obtaining far more adequate architectural data than we did in our survey, so we shall elaborate no further here.

As has been mentioned previously, sites representing specialized activities also increase. The number of hamlets and salt production sites in Late and Early Venta Salada are essentially the same; that is, 16 and 14 respectively, but 5 of the earlier salt sites are re-used during Late Venta Salada times. The canals of Early Venta Salada continued in use and were extended, and a new canal system was started. Field border systems became more popular (8 to 20) in Late Venta Salada and the fields encompassed were larger and more numerous. Retention dams were a new feature in five of these field border systems. Further, shrines containing xantiles, often situated on older hilltop ruins, increase from 6 to 17.

All in all, the trends that started in Early Venta Salada reach their culmination in the late part of the phase, and there are general increases. Clusters of sites in the valley, however, have dropped to three, or possibly four, in Late Venta Salada. The ethnohistoric data hints that these may be correlated with three or four political entities at the time of the Conquest, which might be called *cacicazgos*, or city-states. Using our present terminology, these might be considered to be "super-communities," or clusters composed of a series of "sub-clusters" of communities which make up a series of closely related settlement types.

The northernmost cluster apparently had as its center the huge town or city, that, from the early Spanish documents, was probably the original site of Tehuacan. Closely connected to it, and perhaps part of the same community, is a smaller town (Tr 230—perhaps the ancestor of present-day Trinidad or Chalma), as well as a number of salt sites just to the east. Another community within this city-state might have had its center at the town of Tr 216 (ancestral Chilac), with the village, Tr 245 (ancient Altepexi), as well as three or four salt sites and indeterminate sites affiliated to it. Perhaps also the hamlets Tr 367 and Tr 368 (possibly ancient Ajalpan and Zinacatepec) were part of this community. North of Tehuacan is a cluster of cave sites and indeterminate sites that run roughly from El Riego to Chapulco. Whether this represents an ancient Chapulco community or not remains to be proved. This is equally true of the cluster of four indetermi-

nate sites near present-day Tepanco and the village site and salt site near Tlacotepec.

Just to the west of this northern cluster is another with a series of sub-clusters or communities within it. The community nearest to Tehuacan has as its center Tr 319, with three affiliated hamlets (Tr 313, Tr 314, and Tr 315) as well as a quarry site (Ts 58) and a salt site (Tr 316). These may have composed a community ancestral to present-day Zapotitlan. To the west of it are two other sub-clusters, one composed of nine hamlets, and a village with its town center at Tr 328. This could well be a community ancestral to present-day Teloxtoc. The other sub-cluster has a town center at Tr 357, surrounded by five indeterminate sites and a hamlet. This could be the prehistoric community of Acatepec. The population records and the ethnohistoric data hint that this whole cluster with its three communities was some sort of political entity (city-state) which we are calling Zapotitlan, but its real capital may have been near Metzontla (outside our area of intensive survey).

The cluster in the center of our valley is being thoroughly investigated under a three-year program directed by E. Sisson. This undoubtedly was the *cacicazgo* of Coxcatlan. Most of its tributary towns are shown on the 1580 map. Many of these we believe we can locate archaeologically. Tr 62 is definitely the ancient town of Coxcatlan, and probably part of this same community were three hamlets along the banks of the Rio Salado, as well as the village, Tr 155. Closely connected with the Coxcatlan community is one to the south with its center at Tr 65, and three villages and six hamlets are affiliated with it. It has been suggested that this might be ancient San Mateo Tlacuchcalco. Still farther south is the Tilapa community with two town sites, two villages, and a host of indeterminate sites. In terms of geographical distribution, there is good reason for placing it in the *Señorio de Teotitlan*, but the relaciones and early maps indicate otherwise. West across the Rio Salado, a host of salt sites as well as two hamlets and a village may be the Axusco community. The large town, Tr 57, and its associated salt sites, could be the ancient community of San Jeronimo Axotilco. To the east of it and along the banks of the Rio de los Mangos is the Calipan community with two towns, four villages, a hamlet, and indeterminate sites. Tr 205 and its salt site may have been ancient Comulco or San Pedro Otontopeque.

The southernmost cluster within our area of survey would have been part of the ancient *cacicazgo* of Teotitlan, with Tr 115A the capital, and a village and ham-

let and indeterminate sites connected with it. A second community within it would have included the town, Tr 135 (ancient San Antonio Nanahuatpec), with its associated village, salt sites, and indeterminate sites. At the mouth of the Rio Calapilla and Rio Xiquila would be still another community with a central fortified town connected with two hamlets and various irrigation features. Whether this was Tecoacla, the ancestor of the modern community of Los Cues, cannot be determined. The Relaciones de Teotitlan and the mapa de Teotitlan indicate that the other communities of this señorío were in the mountains to the east, well outside our area of survey.

All in all there seems to be a high correlation between Late Venta Salada sites and actual communities at the time of the Spanish Conquest. Further, the four clusters of sites and communities seem to be connected with ancient political entities; i.e., cacicazgos or city-states. Whether all of these city-states and the Venta Salada Phase can be connected with a larger political entity, the Señorío de Teotitlan, which may have been an independent island within the Aztec Empire, cannot be determined without much further investigation. In fact, the whole ethnohistorical aspect of Late Venta Salada is crying for further study. Despite this, a study of Late Venta Salada remains indicates there was a natural cultural unity with rather definite boundaries. Two of the northern sites around Tlacotepec have a definite Late Venta Salada ceramic complex, while contemporary sites at Tecamachalco and Tepcaca do not. To the east, sites in the mountains have yielded sherds of Late Venta Salada types, but Postclassic sites at Orizaba, Cordoba, and at the nearby historic site of Quauhtochco on the east flanks of the Sierra Madre have another congeries of ceramic types. To the south, there is a sharp break where the ceramics from Los Cues are definitely Late Venta Salada, but the Postclassic sherds from nearby Tecomavaca, Quio-tepec, and Cuicatlan are of another related ceramic tradition. Survey to the west of the Tehuacan Valley was not very thorough, but sites from Acatepec and Teloxtoc are definitely Late Venta Salada, while collection of Late Postclassic sherds from much farther west (50 miles) at such sites as Miltepec, Tepei, and Huahuapan de Leon seem to be connected to the Mixtec Coixtlahuaca or Monte Alban VI ceramic tradition.

Although we have a considerable amount of archaeological information about the settlement pattern of Late Venta Salada, it is obvious that more is necessary. Perhaps more profitable would be a tapping of the rich settlement pattern data in the ethnohistorical

sources. This is the major problem for future investigators.

The Survey Sites

Habitational Sites

Tr 165. This village is located 2.2 km. south of Coxcatlan on a flank on a small tongue of the mountain, just to the south of Barranca Atempango. The hill is terraced with a small pyramid in its center on which were xantil fragments as well as multi-room house foundations with the walls still standing. These walls are usually the double-masonry type with mortar in between the masonry. Some rooms also have stucco floors and the outside of many walls had been covered with stucco; some of them had been painted red and white.

Tr 126. This village is 1.8 km. northwest of San Rafael, and about 200 m. east of the Rio Salado. It is on a small hill, and the sides of this hill have been terraced. On the summit of the hill is a small pyramid, while the remains of houses occur on all three of the terraces. The middle and part of the lowest terrace have large rocks at their edge overlooking steep banks, suggesting a fortification and not just a terrace wall, but they could be the latter. (See Fig. 191.)

Tr 286. This site is almost exactly 2 km. south of Teotitlan del Camino. It is situated just west of the road to San Martín and on the flank of a large hill, which has been terraced and includes house foundations.

Tr 326. This site is 5.8 km. southwest of Zapotitlan on the south side of the highway to Huahuapan de Leon. It is situated on the flank of a long rolling hill. This hamlet is mainly a flint quarry site, but it has been terraced by at least three long lines of walls which have house foundations on them.

Tr 231. This site is about 5 km. southeast of Tehuacan and 2.5 km. directly east of Chalma. It is at the rising edge of the valley floor. There are seven battered stone mounds, and red stucco on them suggests they may have founded multi-room house foundations. There also is one pit that has a stucco finish like the pit for making bark cloth found in Zone C of Tc 35 east.

Tr 135. Tr 135 is located at the southwest quadrant of the Tehuacan Valley, about 3 km. south-southwest of San Rafael and 2.7 km. north-northwest of San Antonio Nanahuatipan and just west of the village of San Gabriel Casa Blanca. The town is strung out along the east flanks of Cerro Prieto overlooking the Rio Salado to the east. On four spurs of the hill, building founda-

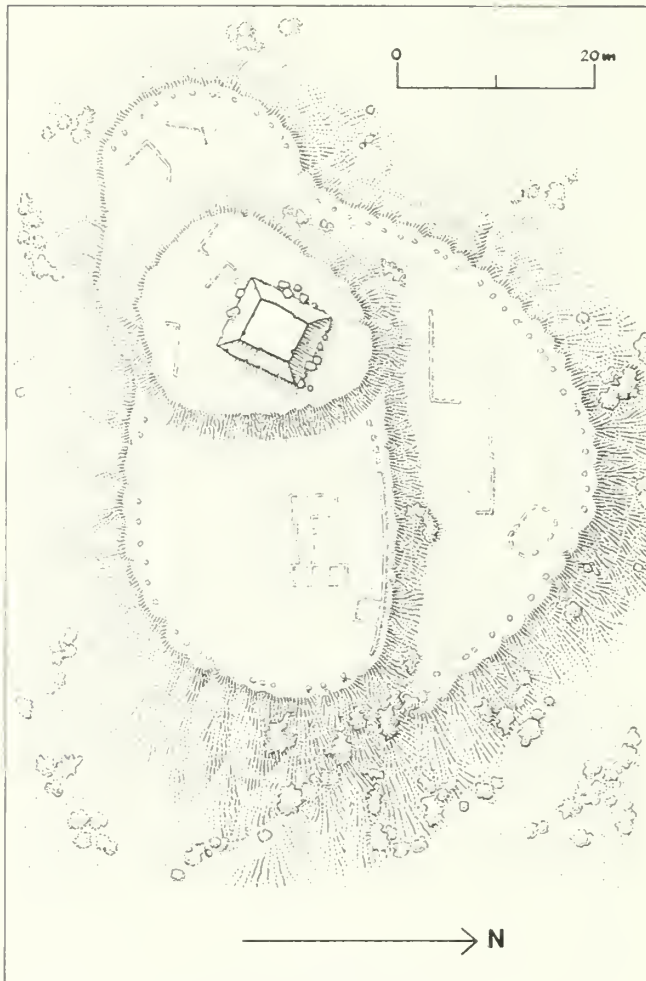


Fig. 191. Map of Tr 126.

tions of unmodified boulders were noted on the numerous small terraces constructed on the flank of this long hill. The terraces range from 2 m. to 10 m. wide, and 3 m. to 15 m. long, and they were bordered by walls of unmodified boulders one to four courses high and one to two rows wide. Mounds of reddish earth faced with stone had been constructed around plazas on two of the larger promontories or spurs on the northern part of the site. Although badly disturbed by looters and those seeking stone for reuse, the north spur had at least 200 mounds on it, but, in spite of the general arrangement, mounds were most discernible on the more southern of these two promontories. Here there were seven roughly rectangular-shaped mounds, bordering the edges of a large rectangular east-west oriented plaza that had a centrally located square mound. This could have been the center of the town. Two smaller, roughly circular, mounds of about the same size were located in a north-

south line on a lower terrace to the east of the plaza grouping. This may have been the ceremonial center of only a barrio. Large numbers of xantil fragments suggest shrines or higher status occupations within the site.

Tr 350. This site is along the north side of the Tehuacan to Huahuapan highway at Km. 35, and is on the south-east end of the Zapotitlan Valley, just below Acatepec. The hamlet is a small hillside site with many architectural retaining walls on the side of the hill, and a few single-room houses.

Tr 185A, Tr 185B. This site, 2.4 km. northeast of Calipan, is on either side of the Barranca de los Mangos. We divided this village site into 185A on the north bank and 185B on the south bank of the stream. Both are located on the sloping valley flank; 185A extends along that bank for about 200 m. and back from the river about 50 m. This flank has been terraced and bears about 40 multi-room house foundations, as well as one small mound about 6 by 10 m. facing another roughly 10 by 10 m. mound, perhaps forming two sides of a plaza. A relatively high proportion of Striated Buff sherds (molds) suggests that some people of this village may have been involved in the mass production of pottery. On the other side of the river is 185B on an elongated hill; the hill has been terraced, and huge boulders are set at the top of the hill, suggesting a fortification. On the terraces and on top of the hill surrounded by the line of boulders are many multi-room house foundations and a few single-room structures which have quite a bit of plaster adhering to them. These surround two pyramids facing each other. (See Fig. 192.)

Tr 128. This site is 1.6 km. west of San Rafael on the west bank of the Rio Salado, just above where the arroyo from Coxcatlan enters the river. The site is on a low north-south oriented hill with four low prominences. The hill has been terraced on the east side, and on the top there are about 25 multi-room house foundations made of neatly-cut stone. The west side has an outcrop of rock and looks as if it was once a rock construction quarry. The sherds included quite a large number of Texcoco salt-making sherds, indicating perhaps a salt manufacturing site nearby.

Tr 285. This site is about 6 km. directly west of Tilapa, 1.5 km. west of San Gabriel Casa Blanca, west of the Rio Salado. It is on the top of a mountain called Cerro Nahualtepec. The hill, oriented east and west, is terraced up the east side. On the flanks of the hill, as well as on the top, there are about 20 multi-room slab-walled house foundations which have stucco floors.

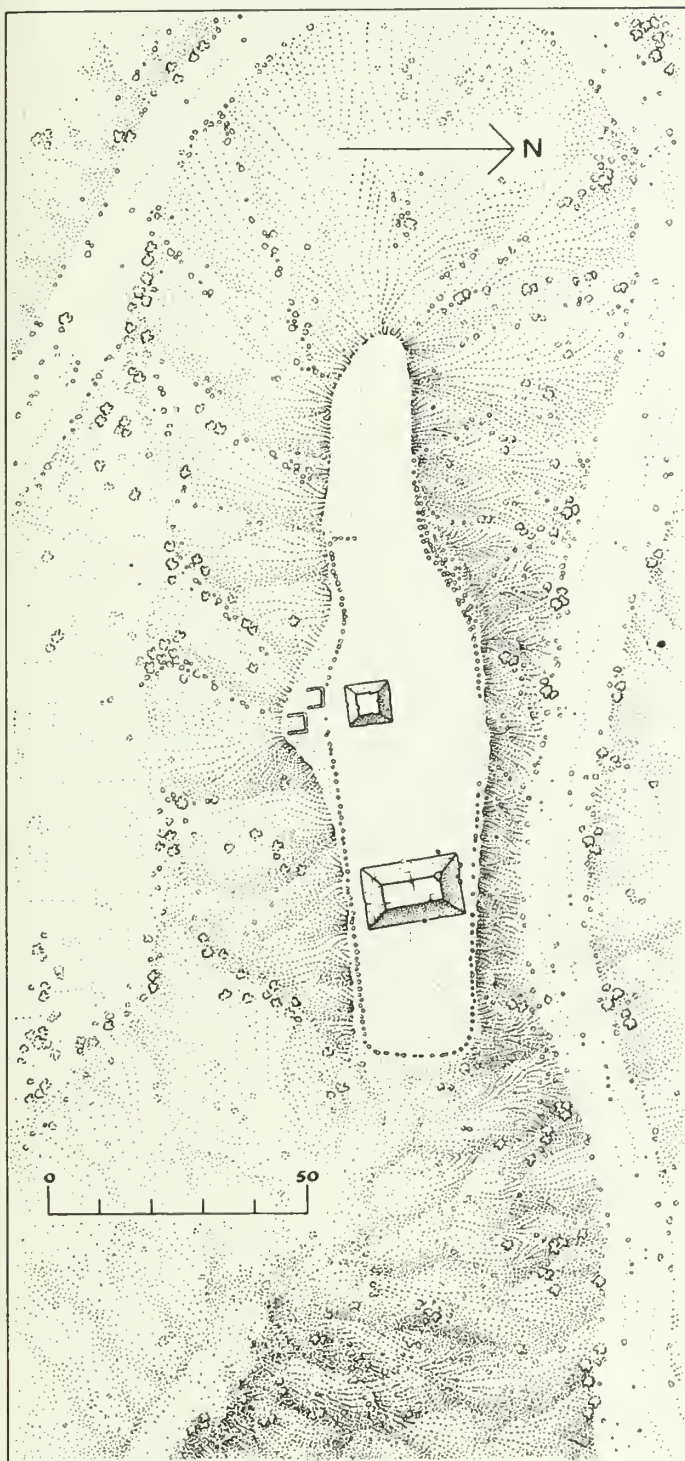


Fig. 192. Map of Tr 185B.

Right on top of the hill there are two large stone mounds made of quite large well-cut blocks of stone.

Tr 129. This hamlet on the western peripheries of San Rafael is on a north-south oriented hill. The south flank of the hill is terraced while the top is outlined by boulders too large to be anything but a fortification wall. Inside this is a series of house foundations of varying sizes and constructions.

Tr 57. This is a town site of the Venta Salada Phase and is located 5.3 km. west-southwest of Coxcatlan on a great plain that is west of the Rio Salado and the Venta Salada railroad station. The site is huge in size, and mounds and house platforms extend over an area about 4 km. north and south, and 2 km. east and west. In the south portion of the site there is a large irrigation canal from 2 to 4 m. wide with 2 rectangular guard houses on either side of a portal area. We attempted to map this site (as did J. L. Lorenzo's archaeologists) but failed miserably because of its huge size. All told, there were over 300 mounds in the area and literally thousands of house platforms. In the southeast corner surrounded by the canal there were 4 mounds making a rectangular plaza; then just south of these mounds were a number of small U-shaped multi-room house platforms, and all around these 20 or so house platforms we could pick up obsidian blades and cores. Just to the east of this area was another mound group, and around it, again, a whole series of house platforms, some of which were associated with slab-laid, box-like tombs that had been covered with stucco. In this area we noted that there were many projectile points. Just south, and outside the canal wall, there was another group of mounds, and with these mounds were about 30 amorphous salt mounds. In this area we picked up fabric-impressed salt-pan sherds. In the north perimeter just inside the north wall of the canal we also found another mound group. Here we picked up quite a large number of broken pierced sherd spindle whorls. One of the mounds seemed to cover a large tomb with large slab masonry. All this suggests to us that within this huge town there were barrios where full-time specialists in various crafts lived, and that each of these barrios was associated with a rectangular mound and plaza region where the leaders or nobility in charge of each craft industry lived. (See Fig. 193.)

Tr 339. This site located 8.5 km. west-southwest of Zapotitlan is on the northern slopes of a long hill, oriented in a northeast-southwest direction. The terraces and the multi-room house foundations of stone slabs

are located just below the crest on the west flank of this hamlet.

Tr 340. This hilltop village is 9.2 km. southwest of Zapotitlan and about 2 km. northeast of the Colonia San Martín and along the Huahuapan-Tehuacan highway. The hill is locally referred to as Mirador Citos. The flank of the hill has been heavily terraced, but on top are 4 multi-room house foundations which are outlined by cut stone and have stucco floors. There is also one rectangular mound made of cut-stone slabs oriented east and west.

Tr 329. This site is located on the west of the valley of Tehuacan on the southern reaches of the Zapotitlan Valley about 200 m. southwest of Km. 34.5 of the Tehuacan to Huahuapan de Leon highway, approximately 12.6 km. south-southeast of Santa Ana Teloxtoc and 9.7 km. southwest of Zapotitlan. Situated towards the base of the moderately sloping east flank of the Cerro de la Hierba or Cerro Lagunilla were a whole series of slab-lined house foundations with stucco. The majority of these structures had multiple contiguous rooms and were constructed in a straight line of two or three rooms, in an L-shaped arrangement, or in the form of a U. Some of them probably had patios located between the arms of the L and in the center squares of houses. The remaining foundations observed were one-room structures. These number about eight or ten. In several instances small slab-lined hearths or cists with a grinding stone within them were found within the smaller rooms of the multi-room houses. The remnants of about five linear field borders forming low agricultural terraces also occurred in the east part of the site. Large quantities of flint tools and chips suggest that flint-knapping was a major industry.

Tr 230. This town is located 4.8 km. east-southeast of Tehuacan and about 2.1 km. directly west of Chalma. The site is on a plain and the flanks of the mountains in this area and is oriented in a roughly east-west direction. Most of the hill is terraced by neat cut-stone slabs, and these are between 3 m. and 20 m. in width. On these terraces were over a hundred house foundations of slabs, and more than half were of the multi-room variety, either long straight lines or L- or U-shaped. Besides these, on the top terraces there were about 25 large stone-faced mounds forming at least four widely separated rectangular plazas oriented usually east and west. Usually there were four mounds to a plaza, but there was one mound inside one of the central plazas. Nearby there also was the possibility of

at least one ball court made of two parallel mounds. Large proportions of xantiles, Striated Buff, and spindle whorl sherds suggest shrines, pottery-making, and textile-making, but no specific areas of such were determined.

Tr 26. This site was one of our northernmost of the Late Venta Salada period. It was up the side of a mountain about 6.4 km. west of Santa Maria La Alta, and 11.5 km. from the Puebla-Tehuacan highway and Tlatlatopēc. Recent agriculture had badly disturbed the site, but there was at least one mound of cut-stone slabs observable.

Tr 160. Centrally located within the Tehuacan Valley, approximately 3.3 km. west of the town of Coxcatlan and .4 km. southeast of Calipan, Tr 160, with its many small mounds and house foundations, is situated on the remnants of natural terraces in the cane fields to either side of an intermittent stream channel known as the Barranca de los Mangos.

Tr 63. This site was about 2.1 km. north-northwest of Coxcatlan Cave and covered the flanks of a mountain called Cerro Zapote. It actually was a huge site, but we did not totally explore it. The side of the hill had been terraced, and there were over a hundred multi-room stone foundations of large boulders covering the flat and the flanks of the mountain. Of particular note were a large number of xantiles, occurring on the tops of small rises, suggesting that the hamlet also had religious shrines.

Tr 323. This site is situated 10 km. southwest of Zapotitlan on the south side of the highway. It is oriented southwest-northeast and is distributed along a series of low hills in the valley bottoms. These are terraced and have a series of multi-room house foundations in these flattened areas. Large quantities of flint and flint tools, as well as obsidian blades and an obsidian lip plug, indicate that one of the major activities of the inhabitants was flint-knapping both local and imported (obsidian) materials.

Tr 80. This site is 2.5 km. west-southwest of Tilapa, just south of the Barranca de los Burros. It may extend for over a kilometer, but because of the sugar cane crop in the area, only two small hills were examined. One hill had a monumental staircase leading to its summit which contained a pyramid and house foundations. The other nearby hill, with a connecting area of refuse and house features, contained house foundations. At its southwest edge the corner of a foundation of a plastered wall extended 19 meters north and 28

meters east. This might have been part of some sort of fortification. (See Fig. 194.)

Tr 310. This is a hilltop site about 7.5 km. west of Zapotitlan and 5 km. south-southeast of Teloxtoc. It is on the west slope of Cerro Gavilantepec. The top of the hill had been lived on over a relatively small area, about 100 by 50 m., and there were about six small house foundations. The north side of the hill also had been terraced, seemingly for agriculture.

Tr 94. This site is located 1.2 km. directly northeast of Tilapa. It is on a low L-shaped hill, oriented roughly east-west for the long arm, and north-south for the short arm. It is just east of the Rio Tilapa. The hill has prominences on either end, and the eastern one has large boulders at its edge which could be the remains of terracing or a fortification. On its flattened surface were about 10 single-room houses and a mound. The western prominence has 4 small mounds around a plaza but no house platforms were discernible. The rest of the house foundations were on the saddle of the hill or on the terraced flanks of the hill.

Tr 412. These 5 house foundations are associated with the aqueduct *Tr 393* and indicate that it continued in use into this period. The site is on the north bank of the Rio Xiquila about 1.5 km. above its confluence with the Rio Salado.

Tr 328. This site is situated on top of a small hill about 250 m. north and south, and 100 m. wide east and west. The hill is just west of the Tehuacan to Huahua-pan de Leon highway at Km. 32.8. It is 10.5 km. south-southeast of Teloxtoc and about 100 m. west of the highway. It is actually a very large hilltop site with about 30 multi-room slab house foundations and slab mosaic floors with some plaster on them, but there also are about 10 single-room houses, most of which are at the peripheries at the top of the hill. Surprisingly enough, the sides of the hill do not seem to be terraced, nor is there evidence of a fortification on the top. One prominent feature on the top of the hill is an I-shaped ball court oriented roughly north and south. This ball court has mounds on its east and west sides, but the north and south ends are indicated only by vertical walls rather than by actual mounds. Immediately to the east of the ball court are two large mounds at right angles to the east flank and a third mound parallel to it, thereby making a rectangular plaza. About 15 other mounds are spread over the site, probably another wide separated plaza. On the east side of the ball court the site had some polychrome pottery; it also had a large number of basalt, flint chips,

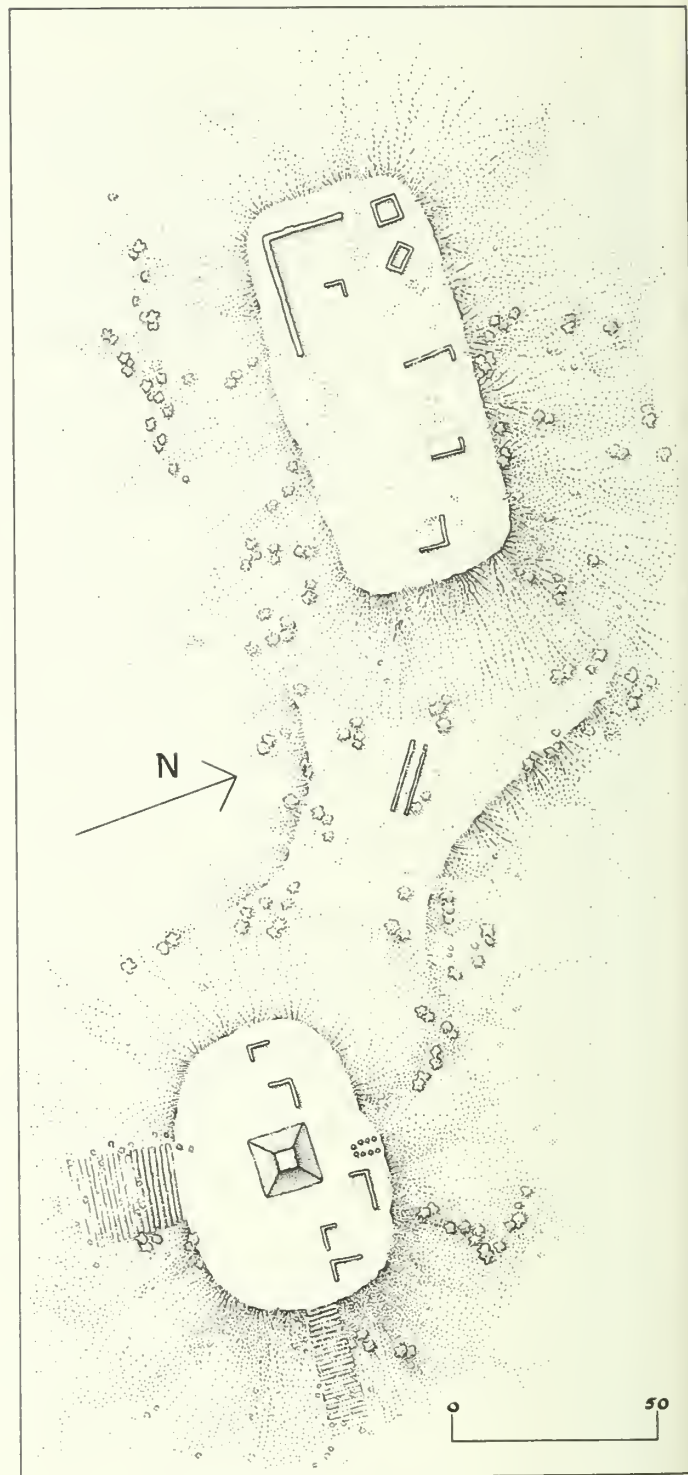


Fig. 194. Map of Tr 80.

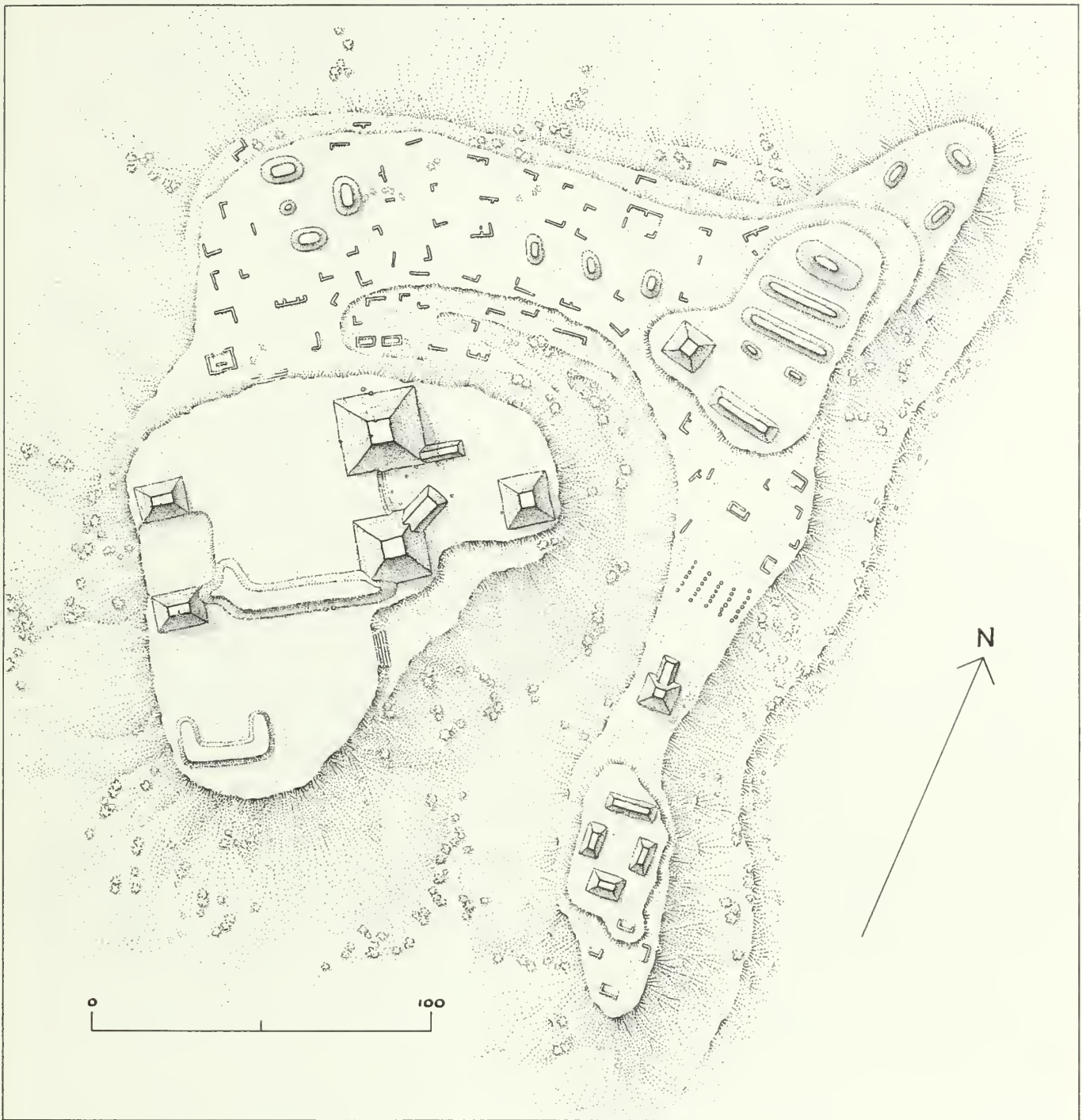


Fig. 195. Map of Tr 216.

and artifacts, indicating it not only had a full hierarchy of peoples in it but also may have specialized in the flint-knapping industry.

Tr 216. This town site is located on the top of Cierrilla

del Xantil, 2 km. directly east of Chilac, and about 5 km. southwest of Altepxi. The whole area is surrounded by fossil irrigation ditches. Tr 216 covers the whole top of this mountain and may be divided into three sections: east, north, and west. It is a huge hill-

top town, almost a city. Around the west edge large boulders seem to indicate that the site was encompassed inside a huge fortification. In this general area we found a number of round columns as well as quantities of flint, obsidian tools, and Striated Buff sherds. Inside the walls were at least four main plaza groups, two of which were bordered on all four sides by various kinds of pyramids. Many of the pyramids have in front of them small apron-like lower platforms. In the east section a ball court oriented roughly east and west is composed of two mounds parallel to each other. The center of the court is about 30 m. long and 5 m. wide. To the south across a plaza open east and west is another square pyramid with an apron front. The sides of all sections are terraced and have house foundations on them. The east section has only a few foundations in the plaza area, while the north section without any mounds has more house remains. (See Fig. 195.)

Tr 314. This site is located just west of the road from Tehuacan to Huahuapan de Leon at Km. 13.25 and is about 2 km. south-southeast of Texcala. It is in a low small canyon entering the road from the west; the whole side of this canyon has been terraced by retention dams and by agricultural terraces. Besides the check dams and agricultural terraces, there were about 4 single-room houses, set well up on the bank and above the terracing.

Tr 184. This town, badly destroyed by cultivation, is on a hill flank about 1 km. east of Calipan on the south side of the Barranca de los Mangos. The north part of the site had house platforms on a series of 8 terraces associated with many fine blades and Striated Buff sherds, perhaps indicating specialists in flint-knapping and mold-made pottery production. Southward across a small arroyo was a terrace with at least 8 mounds with the eastern 3 enclosing a plaza. The west side was made up of a ball court with two parallel mounds, and west of it were 3 parallel mounds around a plaza open north and south. Xantil fragments occurred on them. On a slightly higher terrace still farther south were 5 mounds with round columns enclosing a plaza.

Tr 134. This site is on the west bank of the Rio Salado, just across from the mouth of the Rio Tilapa where it enters the Rio Salado. It is on the hill flank and covers an area of about 100 m. north and south and 50 m. east and west. Most of the site is on the south end of the hill and consists of about 50 house foundations, most of which are multi-room, and at least 3 rock mounds with a number of artificial terraces.

Tr 324. This site is just west of the highway from Tehuacan to Huahuapan de Leon at Km. 33.5, just across the highway to the west of Colonia San Martín. It follows the flank and the contour of the river terrace, 12.5 km. south-southeast of Teloxtoc. It extends along the river terrace for about 275 meters and back up the hill for about 100 meters. The hill has been terraced; besides the terraces, there are 6 multi-room foundations made of cut slabs, as well as 4 small single-room houses. There is also, in one of the small arroyos, a retention dam to hold the soil, probably for agricultural purposes. The site is heavily covered with flint; this small hamlet evidently also served as a flint-chipping station.

Tr 330. This is a hill flank site about 2.5 km. south-southwest of Zapotitlan, along both sides of the Zapotitlan-Los Reyes road. The most noticeable part of the site is about 150 lines of stone to make the terracing which sloped down the hill. Directly to the side of these terraces in a line are 5 house foundations covered with flint debris.

Tr 411. This is another site associated with the aqueduct 393 along the Rio Xiquila, and about 3 km. up from its confluence with the Rio Salado. The small house platforms, mainly of the single-room variety, are in an area of about 60 by 30 meters. They are right above the dam and across the bank a little farther west of Tr 405. These 4 houses seem to be small guard houses, and there is one large multi-room house. All consist of roughly-made slabs of rock with paved floors.

Tr 327. This site is just about half a km. north of the Tehuacan-Huahuapan highway at Km. 32.8 and 7 km. southwest of Zapotitlan. It is spread along the flank of the hill for about 150 m. and extends up the hill for 100 m. It overlooks a large arroyo and has been heavily terraced. It is also covered with flint and seems to have been a quarry. On one of these terraces there were 6 single-room house foundations made of slabs.

Tr 245. This site is situated down on the flat plain about 2.5 km. to the southwest of Ajalpan and 2.5 km. to the southeast of Altepeixi. The site is peculiar in having three small mounds on its west side, one to the east, and one to the south, while in between were house foundations. Most of the refuse included evidence of flint-knapping activities.

Tr 316. This site is 3 km. south-southeast of Texcala at Km. 15.25 on the Tehuacan-Huahuapan de Leon highway. The site is on a small prominence and hill

flank just to the east of the highway and right above the arroyo. There are 6 long house foundations of dressed stone blocks on the top of the hill, and about 10 smaller single-room houses on the terraced flanks. The hill also had, farther down and nearer the river, a series of linear boulders for agricultural terracing.

Tr 166. This hamlet is located on the hills to the west of the highway about 6 km. directly south of Coxcatlan. The site on the western flanks consists of 50 house foundations on terraced parts of the hills.

Tr 357. This site is about 5 km. to the southwest of Acatepec and is situated on a long, east-west low hill. The site has been very badly looted, but along the top edge of the flattened hill, huge blocks indicated that the site was once fortified. There are, on the top of the hill, multi-room, rectangular, or U-shaped house foundations made of cut blocks, while on the terraced sides are one-room houses. Also, right in the middle of the main flattened center of the hill, is a huge mound about 4 m. high of cut stone blocks. There also are tumbled-down round discs which were probably parts of cylindrical columns for two smaller mounds just north of this large mound, making a plaza about 20 by 30 m., the long axis being east-west.

Tr 296. This is a huge site on a large mountain-top due south of the junction of the Rio Salado and the Rio Calapilla, about 6 or 7 km. west-southwest of Teotitlan del Camino. The top and flanks of the hill were occupied. The site had been badly looted, but there were a number of terraces both on the sides and right at the edge of the top of the hill, the latter of which might be a possible fortification. This town included at least 40 multi-room house foundations made of cut limestone blocks, usually with stucco floors. There also were lying around a number of round stone discs of columns, as well as baths and cists lined with stucco that looked like water containers. On top of the center of the hill there are two or three plazas surrounded by eight or more neatly-made mounds. Also leading up to these terraces and plazas are huge, monumental stairways. There also seem to be parts of cruciform tombs that had once been covered by a huge slab roofing.

Tr 139. This site is on the west side of the highway just about half-way between Pueblo Nuevo and San Rafael, just south of the large hill called Sierra Colorado. It is a hill oriented roughly north-south. The side of the hill is terraced and has some house platforms on it. Other house platforms are on the top of the hill, as are three mounds with one large and one small along

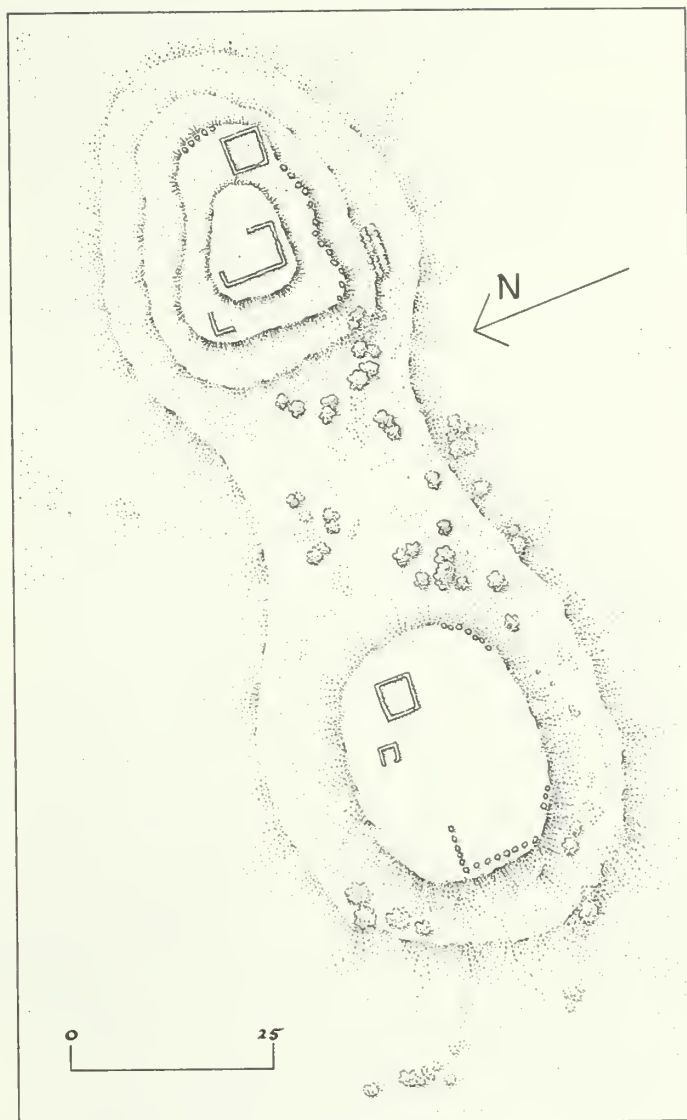


Fig. 196. Map of Tr 163.

the east edge, and a smaller one in the center, thereby forming a plaza open to the north and south.

Tr 163. This village site is about 3 km. southwest of Calipan on the north side of the peninsula between the Rio Salado to the west and south and the Arroyo de los Mangos to the east. The site is on two long hills oriented roughly east-west. On the hills there are about eight multi-room house foundations, usually of the rectangular variety, as well as four or five square, single-room house foundations. These house foundations are outlined by crude river boulders. These boulders might be part of a fortification terrace wall. (See Fig. 196.)

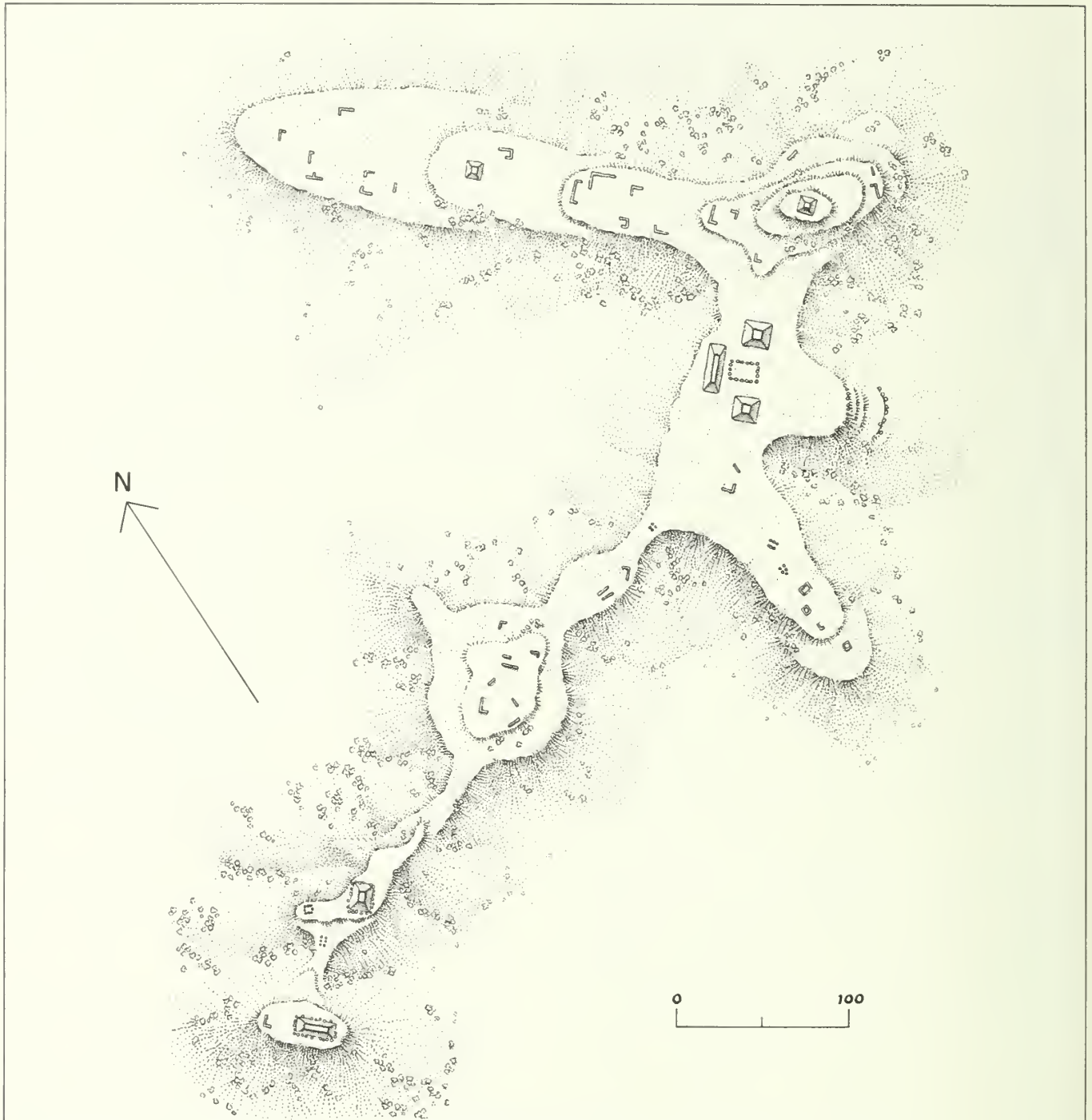


Fig. 197. Map of Tr 78.

Tr 45. This site was the westernmost of the Late Venta Salada complex. It is situated just a kilometer west of Miltepec, about 50 km. west of Tehuacan. In fact, the site is located in the west side of the town of Xuchitepec. We examined this site and found about 5 mounds

on the west end of town that seemed to be around a U-shaped plaza, which is open to the west.

Tr 294. This site is the southernmost of the Late Venta Salada complex and is situated just west of the high-

way from Teotitlan del Camino to Los Cues. It is about half-way between these two towns and just west of the bridge which crosses the Rio de San Martín. It is a terraced hill flank site, and there are house foundations on the terraces.

Tr 167. This site is about 1 to 2 km. east of Axusco, just south of the junction of the Rio Zapotitlan and the Rio Salado. It is situated on the flanks of a series of hills and natural terraces which lead down to the Rio Zapotitlan. On these terraces there are about 40 house foundations.

Tr 78. This is a huge town site on a large hill about 1 km. north of Tilapa. The hill and hill flanks, which are covered by ruins, are about 1 km. east and west and about 800 m. wide. The whole side of the hill is terraced, and on these terraces as well as on the top of the hill are house platforms with plaster. The north-south arm of the U-shaped hill has two prominences on it, both of which are capped by pyramids. The other east-west arm connected to the southern prominence has a long wide central saddle with pyramids, a U-shaped plaza, and terraces, as well as many house foundations. The western portion of this arm has two small prominences which again have pyramids on their summits. Large numbers of Striated Buff sherds as well as many obsidian blades, points, and nuclei suggest that there were barrios of at least flint-knappers and ceramicists in this town. (See Fig. 197.)

Tr 404. This site is on the road to Coxcatlan Cave just north of the telephone line; in other words, about 2 km. northeast of Pueblo Nuevo and just north of Tr 65 to which it could be connected. The site consists of 4 boulder-founded structures. Some of these boulder constructions seem to be U-shaped houses, and they are on the tops of terraces. More prominent were six terraces that seemed to be some sort of dams of terraces for the retention of sheet wash, but they also could have been used for building.

Tr 315. This site is just east of the highway from Tehuacan to Huahuapan de Leon and 2 km. south-south-east of Texcala, at about Km. 13.5. This is a small hill with lines of stone terraces which seem to be agricultural lineal field borders for catching sheet wash. There also are about 7 house foundations.

Tr 115. This site is just south of the highway from Tehuacan to Teotitlan del Camino, at Km. 59.5. It is strung along the road south of the highway. The sides of the hill are heavily terraced, and there are about 40 house foundations. There are also a series of earth-re-

tention dams and check dams on the hill slopes. Three mounds seem to be formed around a U-shaped plaza which is open to the south.

Tr 75. This town site is located 2 km. northwest of Tilapa. It is a long, north-south oriented hill of about 1.5 km. maximum length with seven spurs projecting from it. The northern three spurs, which were not explored carefully, have a number of mounds surrounding at least three plazas, as well as house foundations. The north-central saddle is heavily terraced. The northernmost terrace has mounds around a plaza. House foundations occurred here. A spur sticking out to the west from this saddle is also heavily terraced with house foundations and has a ball court in the saddle area, other mounds, and columns from some large structure. Opposite and projecting to the east are two other mounds, and on the spur many plastered foundation remains. The two southernmost spurs also have many terraces and evidence of houses and mounds on each of them. Many flint tools and chips, Striated Buff pottery mold sherds, and spindle whorls hint of specialized activity areas within this town. (See Fig. 198.)

Tr 91. This site is 1.5 km. west from Coxcatlan and just east of the highway and north of the bridge between Coxcatlan and Calipan. The site extends over a series of low hills roughly oriented northeast to southwest to the outskirts of Calipan itself. This seems to be a large town, probably associated with the protohistoric village of Calipan and part of the area(?) tested by Noguera (Noguera, 1940). On the terraced flanks of the hill we found over 200 large rectangular, U-shaped, or linear multi-room house platforms, as well as single-room platforms. There are over 15 mounds which seem to be associated with a number of U-shaped, rectangular, and two widely separated plazas. There is a possible ball court. Again, associated with the mounds there is quite a lot of stucco flooring as well as xantiles.

Tr 337. This site is about 8 km. west of Zapotitlan and about 1 km. south of the Rio Zapotitlan and the arroyo coming in from Teloxtoc. The site is strung along the north flank of a hill and has agricultural terraces as well as living terraces with house foundations and a great deal of flint, indicating a quarry.

Tr 115A. This site is up the hill on the east side of the town of Teotitlan del Camino and probably represents the historic and protohistoric and late prehistoric city-state capital, Teotitlan, with a population of 10- to 20,000. Most of the present site is underneath the

town. All that we can say is that there are quite a few plaza mounds, terraces, and house foundations at the east edge of town, which seem to form at least ten barrios on the tops of ridges. Like Coxcatlan, there are often two or three mounds at the summits of the ridges and multi-room house structures are on the terraced sides of them. Some of the houses in some of the barrios seem to have been of specialists in flint-knapping and pottery making.

Tr 159. This site is just south of the junction of the Barranca de los Mangos and the Rio Salado about 3 km. to the west-southwest of Coxcatlan. It is on a series of finger-like peninsulas that stick down toward the Rio Salado. There are some terraces along the edge of these flanks, and there are a number of house foundations on each one of these tips.

Tr 162. This site is about 2 km. southwest of Calipan on the north bank of the Barranca de los Mangos, about 1 km. up from its junction with the Rio Salado. These again are long, peninsula-like fingers that stick down toward the arroyo, which had been terraced. On the terraces there are house foundations, while the highest terrace has five small mounds enclosing a plaza.

Tr 155. This site is located about 2 km. west-southwest of Coxcatlan on a long terrace in the valley plain. It is about 200 m. long and 50 m. wide and has about 50 multi-room house foundations, either the rectangular or the U-shaped type. It also has three small stone mounds on it, but they do not seem to form a plaza.

Tr 125. This site is about 1 km. south of Puebla Nueva on the east side of the road between it and the Rio Salado looking across to the east at Cerro Colorado. It covers an area about 150 m. in diameter. On top of this small hill there are five small stone house foundations and about five big ones.

Tr 1. This is the historic site seen by the Spanish at the time of the conquest of Tehuacan. It is about 1 km. east of the present town of Tehuacan, just east of the Rio Salado in an area that is often referred to as Las Flores. The site is strung out all along the whole western flank of the Sierra Colorada. In fact, it is strung along the edge of the Rio Salado for almost 3 km. and continues up the hill almost to its top, a distance of between 1 and 2 km. Again, this site was too large for us to map totally. This huge hillside city was terraced all the way up the flanks, and, around certain sections of it, there are definite evidences of fortress-like walls rather than just terracing. This site might continue right on up to the top of the Sierra Colorada, which

was inhabited, and which has a number of terraces, pyramids, and different plazas of Postclassic type, as well as two mound ball courts. We are somewhat loath to give any exact figures for this site, but we did see over 200 multi-room house platforms and probably 200 or 300 single-room house foundations. Also, as we walked over the site, we counted over 60 pyramids of one sort or another, and many of these were in plazas at the foot of 10 to 20 ridges with terraces that contained house platforms. Again, there were a couple of areas that looked to have had full-time specialists. There was one set of terraces covered with blades and flint chips at the north end of the site, nearby and down on one of the peninsulas, not too far from Chalma. There were Striated Buff sherds, three or four amorphous salt mounds, and some salt-pan material on the plain itself. Again there seemed to be a general tendency for the single-room house foundations higher up the hills or valley to be on not quite so well ranged plazas, while the larger, rectangular, or U-shaped house foundations and large mounds around enclosed plazas were at the edge of the cliffs below the house structures.

Tr 158. This site is approximately 4 km. to the south of Coxcatlan. It is on a low hill flank between two small dry arroyos. There were only two mounds on this site, and the sherds covered an area of only about 50 by 20 m.

Tr 157. This site represented by house foundations and sherds is south of Coxcatlan about a km. west of the highway on a small hill on the bank of the Arroyo Atempango.

Tr 141 and Tr 142. These two sites are situated about 2 km. north of Puebla Nueva and about 5 km. south of Coxcatlan, just east of the highway. Both of the sites are located on a long L-shaped hill that parallels the road just before the bend at the top of the hill. On top of these hills there were a number of xantil offerings and some pendants, particularly on the north end of the hill, referred to as Tr 142. This site with two house foundations certainly looked like a shrine of some sort, probably associated with Tr 65. Tr 142 is just across the highway to the west of this first site, 141, on a hill the road cuts right through. This small hill is heavily terraced for agricultural purposes and has a series of field borders and sheet wash retention dams. Large amounts of convex pottery molds suggest full-time specialists in pottery making resided in this hamlet, or, that it was in fact but a barrio of Tr 65.

TABLE 42
Late Venta Salada Seasonality Data

		Tc 50, I	Tc 35, A	Tc 7 - test	Tc 39 - test	Tc 72	Tc 287 A	Tc 31	Tc 18	Tc 37	Tc 88	Tc 2	Tc 35, layer 2	Tc 201
MICRO-ENVIRONMENTS														
	El Riego Oasis		X		X			X		X			X	
	Travertine Slopes													
	slopes			X										
	Valley Center Steppe													
	humid river flanks										X			
	Alluvial Slopes													
	valley flanks	X										X		X
	Canyons and Dissected Alluvial Slopes													
	hill flanks					X	X		X					
SEASONALITY														
Fall	{ CIRUELA FRUIT	X	X											
	{ AVOCADO FRUIT	X	X											
	{ CHUPANDILLA FRUIT	X	X											
Summer	{ Beans		X											
	{ SAPOTE FRUIT	X	X											
	{ FETAL DEER	X	X											
	{ Squash	X	X											
	{ Corn	X	X						X					
	{ Pepper		X											
Spring	{ LIZARD	X	X											
	{ Turtle		X											
	{ milling stones	X	X	X	X								X	
	{ Mesquite seed	X	X											
	{ Grass seed	X	X											
	{ Setaria seed	XX	X											
Winter	{ Leucaena seed	X	X											
	{ Pochote pod	X												
	{ Deer antler		X											
Fall	{ COYOL FRUIT	X	X											
	{ no milling stones					X	X	X	X	X	X	X		X
	{ COSAHUICO FRUIT	X	X											
COMPONENT DIMENSIONS														
	length in meters	20	—	5	9	25	5	8	40	10	12	24	4	50
	width in meters	4	—	5	3	6	3	4	2	6	7	7	10	2
	extent in sq. meters	80	83	25	27	150	15	32	80	60	84	168	40	100
SETTLEMENT FEATURES														
	xantiles		X			X	X		X	X				
	burial pit		1										X	
	cave niche burial		X				X			5				
	altar fire pit (shrine)		1											X
	cache pit		4											
	fire pit	?	2										1	1
	storage pit		1											
	fired area	X	X	X										
SETTLEMENT PATTERN TYPES														
	Macroband all year		X											
	Macroband summer-fall camps	X												
	Possible Macroband wet-season camp								X					
	Possible Macroband dry-season (open) camp					X								
	Possible Microband wet-season camp			X	X									
	Possible Microband dry-season camp						X	X		X		X		X
	Possible Microband dry-season water-source camp										X			
	Possible Microband all seasons												X	

TABLE 43
Late Venta Salada Specialized Sites

	Tr 324	Tr 141	Tr 313A	Tr 423	Tr 337
<i>with associated habitation</i>	X	X			X
MICRO-ENVIRONMENTS					
Travertine Slopes					
slopes				X	
hill flanks	X		X		X
hilltops					
Valley Center Steppe					
steppes					
hill flanks					
Alluvial Slopes					
arroyo flanks		X			
hill flanks					
hilltops					
SITE DIMENSIONS					
length in meters	100	30		150	100
width in meters	300	60		16	250
extent in sq. meters	30,000	1,800		2,400	25,000
FEATURES					
retention dams	X		X		
aqueduct or canals					
stucco pit					
hillside agricultural terraces	X	X			X
valley agricultural terraces			X	X	
quarries	X				X
xantiles (shrine)					
textile making					
ceramic industry (Striated Buff)			X		
cruciform tomb					
<hr/>					
	Tr 310	Tr 412	Tr 393	Tr 328	Tr 314
<i>with associated habitation</i>	X	X		X	X
MICRO-ENVIRONMENTS					
Travertine Slopes					
slopes					
hill flanks					X
hilltops	X			X	
Valley Center Steppe					
steppes					
hill flanks					
Alluvial Slopes					
arroyo flanks		X			
hill flanks			X		
hilltops					
SITE DIMENSIONS					
length in meters	50	20		100	25
width in meters	100	50		250	120
extent in sq. meters	5,000	1,000		25,000	3,000
FEATURES					
retention dams					X
aqueduct or canals		X	X		
stucco pit					
hillside agricultural terraces	X				
valley agricultural terraces					X
quarries				X	
xantiles (shrine)					
textile making					
ceramic industry (Striated Buff)					
cruciform tomb					

Tr 135	Tr 326	Tr 231	Tr 350	Ts 58	Tr 340	Tr 329	Tr 323	Tr 185A	Tr 230
X	X	X	X		X	X	X	X	X
	X		X	X	X	X	X		
X									
		X						X	X
300	50	100	50	30	30	200	250	50	200
600	150	100	100	30	30	300	100	200	600
180,000	7,500	10,000	5,000	900	900	60,000	25,000	10,000	120,000

X		X	X		5	X	X		
X	X			X		X	X		
	X								X
								X	X
									X

Tr 184	Tr 324	Tr 330	Tr 394	Tr 327	Tr 316	Tr 296	Tr 404	Tr 315	Tr 115
X	X	X		X	X	X	X	X	X
	X	X		X	X			X	
			X						
X							X		X
						X			
200	100	50		100	40	200	50	50	100
200	300	100		150	500	700	50	100	50
40,000	30,000	5,000		15,000	20,000	140,000	2,500	5,000	50,000

	X							X	X
			X						
	X				X		X	X	X
		120		X					
X		X		X					
X					X				
						X			

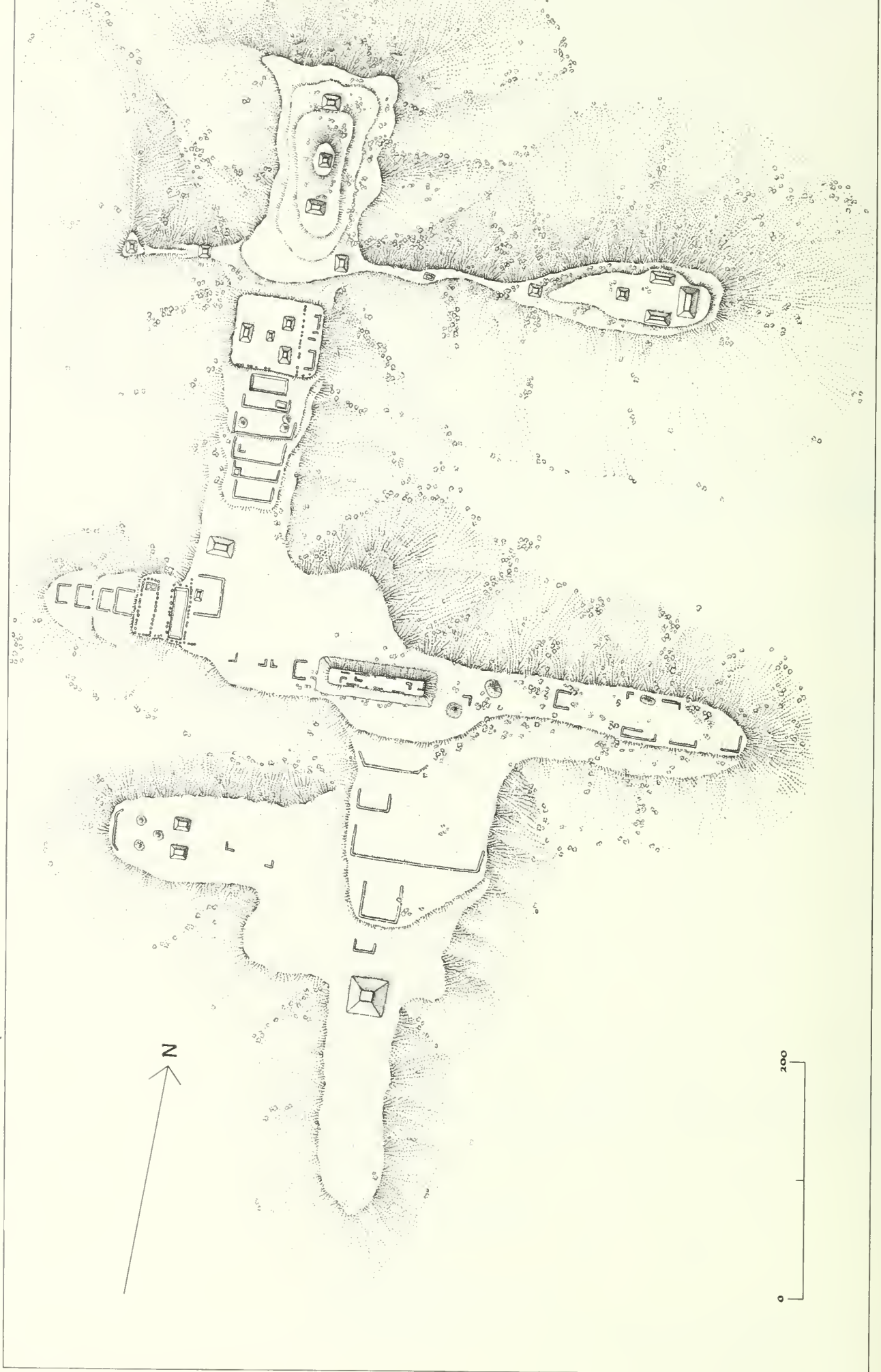


Fig. 198. Map of Tr 75.

T A B L E 4 4
Late Venta Salada Salt Industry Sites

	Tf 120	Tf 218	Tf 25	Tf 242	Tf 206	Tf 199	Tf 194	Tf 244	Ts 201	Tf 53	Tf 187	Tf 202	Tf 220	Tf 238	Tf 154	Tf 193	Tf 241	Tf 178	Tf 177 A, B	Tf 211	Tf 190	Tf 191	Tf 170	Tf 195
<i>with associated habitation (salt hamlets)</i>	X					X					X				X				X		X		X	
MICRO-ENVIRONMENTS																								
Travertine Slopes						X											X							
slopes																		X						
hill flanks																								
hilltops																								
Valley Center Steppe																	X							
steppes																								
Alluvial Slopes		X		X	X			X		X	X		X		X		X			X	X	X	X	X
arroyo flanks																								
hilltops	X																							
SITE DIMENSIONS																								
salt mounds	25	5	4	3	20	30	3	40	3	3	40	18	8	18	12	40	15	100	5	40	100	1K	500	12
circular cists	100	9				X	1					X		1								500	150	2
rectangular bins	2,500					X						X		200								500	6	
canals						X						X		200										
dams						X						X		40,000										
terraces						X						X												
house foundations																								
single-room (blade)						10				20					4	10			13	15	20	0	5	
multi-room, linear	20													2	2				5					

FEATURES

salt mounds
circular cists
rectangular bins
canals
dams
terraces
house foundations
single-room (blade)
multi-room, linear

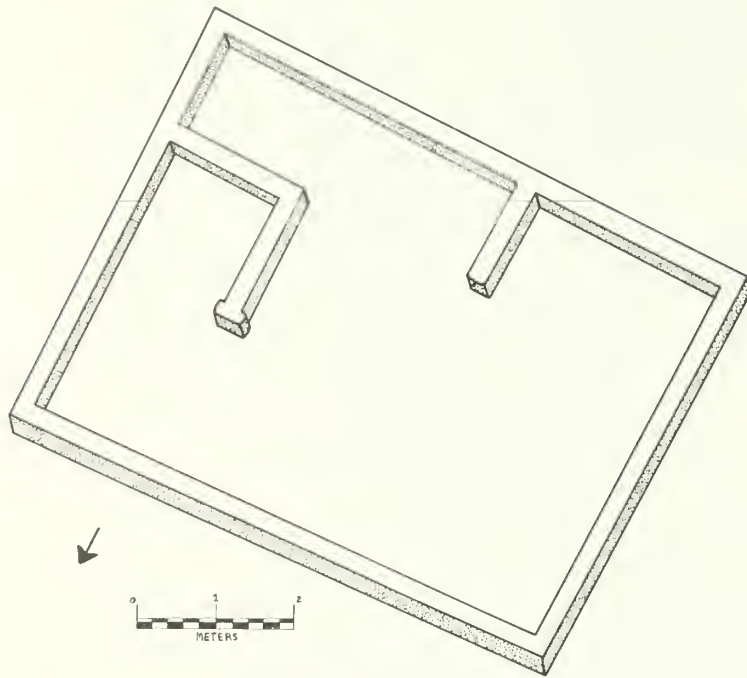


Fig. 199. Tr 205 house at Stage B.

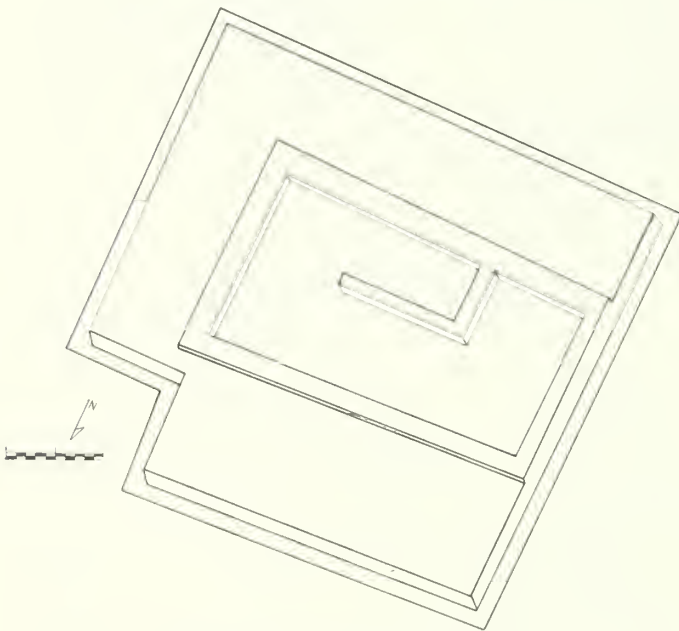


Fig. 200. Tr 205 house at Stage C.

Tr 205. This site was classified as a hilltop Palo Blanco site and has been described in that section. However, excavations by Ed Sisson in 1972 uncovered a Late Venta Salada structure on the south spur of the hill. We have illustrated the two superimposed houses his group uncovered. (See Figs. 199, 200.)

Tr 435 is described in Volume 4.

Tr 367 is described in Chapter 5.

Tr 368 is described in Chapter 5.

Tr 62 is described in Chapter 6.

Tr 65 is described in Chapter 6.

Tr 313B is described below under *Tr 313A* (specialized site).

Specialized Sites

Tr 313A. This site is situated just 300 meters south of Texcala on the west side of the Tehuacan-Huahuapan highway at Km. 12.5. *Tr 313A* is on a natural terrace adjacent to the road, while *313B* is on a higher, natural terrace just northwest of *313A*. Both of these sites have a series of terraced walls, linear borders, and retention dams, and only *313B* has even the remotest possibility of any house foundation on it.

Tr 423. This site, mainly of agricultural terraces, is 7 km. southwest of Zapotitlan on the eastern flank of Cerro Castillo.

Tr 58. This is a small open camp or flint-knapping quarry on top of a hill about 2 km. south of San Antonio Texcala at Km. 13 of the Tehuacan-Huahuapan de Leon highway.

Tr 393 (Early Venta Salada Phase) is described above.

Tr 394. This has been described by Woodbury and Neely; it is the whole system of canals running from San Lorenzo 35 km. down the entire Tehuacan Valley to San José Miahuatlan. The sherds cemented in this group of fossil canals seemed to be of Late Venta Salada types.

Tr 377 (El Riego Phase) is described above.

Tr 337 (Early Venta Salada Phase) is described above.

Tr 324, Tr 141, Tr 135, Tr 326, Tr 231, Tr 350, Tr 340, Tr 329, Tr 323, Tr 185A, Tr 230, Tr 310, Tr 412, Tr 328, Tr 314, Tr 184, Tr 330, Tr 316, Tr 296, Tr 404, and Tr 315 are described above.

Salt Industry Sites

Tr 120 is described above.

Tr 218 is described in Chapter 5.

Tr 25 (Late Santa Maria Phase) is described above.

Tr 242. Discovered in the north-central part of the Te-

huacan Valley, this salt production site is about 3.4 km. northwest of Altepexi and 4.1 km. east-southeast of the village of San Marcos. Tr 242 consists of three amorphous mounds made of earth and gravel oriented in a northeast-southwest line on the valley floor.

Tr 206. This component is located 4.8 km. south-southeast of San Sebastian Zinacatepec, almost exactly 5 km. west of Calipan situated on the east bank of the Rio Salado. It seems to be a salt-production site and contains about 20 amorphous mounds.

Tr 199. This is about 10 km. west of San Gabriel Casablanca, about 1 km. east and down the slopes from Petlanco. It contains salt mounds in association with circular cists, dams, canals, and salt-drying bins, as well as house foundations.

Tr 194. Located in the southwest section of the Tehuacan Valley, this site is 6.1 km. south-southeast of Axusco, and 3.6 km. west-southwest of San Rafael. It is situated on the north flank of a hill known locally as Petlanco. The architectural features observable consisted of three or more salt-processing mounds formed of gravel and red earth, a single slab-lined cist, and the remnants of a retention or diversion dam.

Tr 244. This site is located about 2.2 km. south-southwest of Altepexi, about half-way to the excavated site Quachilco, Tr 218. It is in the valley flats and consists of a long line of mounds along an arroyo bed oriented roughly north-south. These 25 or 30 mounds are amorphous and are made of gravelly reddish-brown earth. They definitely seem to be salt mounds; this seems to be another area of the salt industry which, in this case, was tapping the salt springs coming out of the cliffs north and west of Altepexi.

Tr 339. This site of terraces was on the travertine slopes just to the northwest of Altepexi. Also at the foot of these slopes were a few salt mounds, but, for the most part, it looked like living terraces, which contained Late Postclassic salt-pan sherds on them.

Tr 53. This site is located on the west bank of the Rio Calapilla, about 5 km. upstream from its confluence with the Rio Salado. It actually is on a big bend of the river where the Papalohuapan Commission is making plans to put in a dam. The site is quite small, covers only an area of about 50 by 50 m., and consists of about 6 low earth mounds that seem to be connected with the salt industry.

Tr 187. This site is due west of Puebla Nueva, right across, on the west bank of the Rio Salado, from this town. It is on the bank and flats of this river, running

up and down about 100 m. and extending back about 50 m. There are 30 or 40 shapeless mounds of the salt industry as well as about 20 slab foundations of houses.

Tr 202. This site overlooks the Rio Calapilla, about 4.1 km. west of San Gabriel Casablanca. It consists of two groups of salt mounds, with about 9 mounds in each group in the canyon flats. Some of the mounds have tubular piping for the filtration plant inside. There also are some check dams and settling tanks around these mounds. There still is a small seep of salt coming out above this area.

Tr 220. This site is 5.6 km. south-southwest of Tehuacan and just west of the railroad tracks. It consists of about eight amorphous salt mounds arranged around almost a rectangular east-west oriented plaza.

Tr 238. This site is situated on the west bank of the Rio Salado at Station Santa Cruz, about 9 km. southwest of Tehuacan and about 6 km. north-northwest of Altepexi. It covers an area of about 200 m. in diameter and consists of 18 amorphous salt mounds from 10 to 20 m. in diameter, from 2 to 5 m. high. Besides the mounds there is one stucco pit in the area which may somehow be connected with the filtration of salt.

Tr 154. Located in the southwest portion of the Tehuacan Valley, Tr 154 is about 5.6 km. southwest of the town of Coxcatlan and 1 km. northeast of Axusco. This salt production hamlet with its mounds and house foundations is situated primarily on the valley floor with small portions found on three small, very low hills bordering the area.

Tr 193. This salt production site is located in the southwest section of the Tehuacan Valley some 6.7 km. south-southeast of Axusco, 6.2 km. northwest of San Antonio, and 2.9 km. west-southwest of San Rafael. Again the architectural features directly involved with salt rendering processes were situated on the valley floor, while the habitation areas were established on the flanks of small hills, bordering the salt-processing area.

Tr 241. This salt mound site is located about 5 km. northwest of Altepexi in the flat plains just between the junction of the highways leading from Tehuacan to Ajalpan, and from Tehuacan to Chilac.

Tr 178. This site is located just to the southwest of Axusco. It covers an area about 1 km. in diameter and has more than 100 large salt mounds arranged in groups around waterholes.

Tr 177A and *Tr 177B*. These sites are located about 6 km. south of Axusco, just north of the hill called Petlanco, and below the flanks of the larger mountain, Cerro Tepetroje. These sites are a whole series of amorphous, reddish stone mounds. *Tr 177B* is on the flank of the hill, while *177A* is just a short distance away in the actual bottom flats. They probably are merely divisions of the same site. *Tr 177A* to the east has about 5 amorphous salt mounds, and on the hill flanks, about 8 single-room houses. *Tr 177B*, up the flank of the hill, seems to be relatively free of salt mounds, but it does include about 5 long, rectangular, multi-room houses and also five smaller houses. At *177A* there also are some rectangular drying bins outlined by stone slabs for drying the salt.

Tr 211. This site is about 2 km. east of San José Miahuatlan and about 2 km. west of the Rio Salado, sitting out in the middle of the flat plain. It consists of about 30 or 40 amorphous mounds and is definitely a salt-working site of Late Postclassic times.

Tr 190. This site is located about 4 km. south-southwest of Axusco and sits out in the middle of the plain just below Petlanco to the north. The area is about 1 km. in diameter and has 100 or more salt mounds in it. There also are from 10 to 15 house foundations strung out on the little hills in between the salt-working area. There are also various salt pans and retention dams in the region.

Tr 191. This site is about 6 km. south-southwest of Axusco, out on the flat plain, and is characterized by 60 amorphous salt mounds. On the hills surrounding the salt mounds there are about 20 single-room houses and about 10 rectangular, multi-room houses.

Tr 170. This site is about 3 km. southwest of Axusco in the plains just south of the hill called Cerro Portezuelo. There are about 150 shapeless, amorphous salt mounds in this area that cover almost a km. in diameter.

Tr 195. *Tr 195*, a salt production site situated on the valley floor, is located in the southwest part of Tehuacan Valley about 6.2 km. south-southeast of Axusco and 4 km. west-southwest of San Rafael. The dirt road from Axusco to Rio Hondo, known as Rio Calapilla, crosses this site. Architecturally the site is characterized by about 12 salt-processing mounds, at least 5 multi-room house foundations, and 9 stone-lined cists.

Cave Sites

Tc 18. This site is located 3.8 km. south-southeast of Teotitlan and about 1 km. south-southwest of San

Martín. It is a long rock shelter about 40 m. long and about 2 m. deep on a cliff on the left-hand side of the road. The cave is now used for corn storage.

Tc 201. This is a small cave just to the south of the road leading into Calapilla about 3 km. west of San Gabriel Casa Blanca. The cave is about 15 m. long and 5 or 6 m. wide. It might be added that right above the cave there is a series of salt springs, so it may be considered the habitation for the salt workers.

Tc 37. This is a small rock shelter in the El Riego cliffs about 6 m. wide and running back as deep as 10 m. It is about 250 m. to the west of our excavated site, *Tc 35*. Part of the mouth of the cave had been blocked up by rocks, and there were a number of niches in chambers in the back that also had been blocked by rocks or by wattle-and-daub, indicating that this cave had once had, before it had been looted, a whole series of mortuary niches.

Tc 88. This is a small cave just above the west bank of the Rio Salado about one-half a km. downstream from where the Rio Zapotitlan enters the Rio Salado.

Tc 2. This is a large cave just below the Tehuacan Viejo, *Tr 1*, and is on the east bank of the Rio Salado, 2 km. to the east of Tehuacan itself.

Tc 50, Zone I, is described in Chapter 6.

Tc 35, Zone A, is described in Chapter 2.

Tc 7 is described in Chapter 4.

Tc 39 is described in Chapter 2.

Tc 31 (Early Palo Blanco Phase) is described above.

Tc 72. The cave called Cueva Infiernillo is about 1 km. southeast of San Rafael high in the white cliffs just below the summit of a small pointed hill. Although a few chips occurred, the only artifacts of any quantity were those of xantiles.

Tc 287A. This cave is in the Cerro de la Abra de Coatepec just northwest of San Martín Texcala, Oaxaca. It is a long cave with few artifacts in it. To the west of it on the cliff face, there are three stick figure pictographs of white paint; associated with these were xantil fragments.

Indeterminate Occupations

Tr 349 (Abejas Phase) is described above.

Tc 8, *Tc 10*, *Tc 34*, *Tr 69*, *Tr 73*, *Tr 74*, *Tr 84*, *Tr 90*, *Tr 102*, *Tr 103*, *Tr 106*, *Tr 131*, *Tr 146*, *Tr 169*, *Tr 180*, *Tr 186*, *Tr 217*, *Tr 219*, *Tr 249*, *Tr 251*, *Tr 275*, *Tr 280*,

Tr 302, and *Tr* 304 (Early Palo Blanco Phase) are described above.

Tc 14, *Tc* 17, *Tr* 20, *Tc* 30, *Tc* 33, *Tr* 43, *Tc* 68, *Tr* 92, *Tr* 100, *Tr* 105, *Tr* 116, *Tr* 117, *Tr* 121, *Tr* 147, *Tc* 215, *Tr* 223, *Tr* 227, *Tr* 240, *Tr* 247, *Tr* 270, *Tr* 271, *Tr* 276, *Tc* 295, *Tr* 305, *Tr* 318, *Tr* 321, *Tr* 333, *Tr* 335, *Tr* 342, *Tr* 344, *Tr* 345, *Tr* 352, *Tr* 354, *Tr* 358, *Tr* 416, and

Tr 455 (Late Palo Blanco Phase) are described above.

Tr 42, *Tr* 44, *Tr* 82, *Tr* 83, *Tr* 87, *Tr* 95, *Tr* 97, *Tr* 98, *Tr* 108, *Tr* 140, *Tr* 181, *Tr* 210, *Tr* 226, *Tr* 228, *Tr* 229, *Tr* 233, *Tr* 236, *Tr* 288, *Tr* 289, *Tr* 290, *Tr* 308, *Tr* 319, *Tr* 341, *Tr* 343, *Tr* 347, *Tr* 451, and *Tr* 453 (Early Venta Salada Phase) are described above.

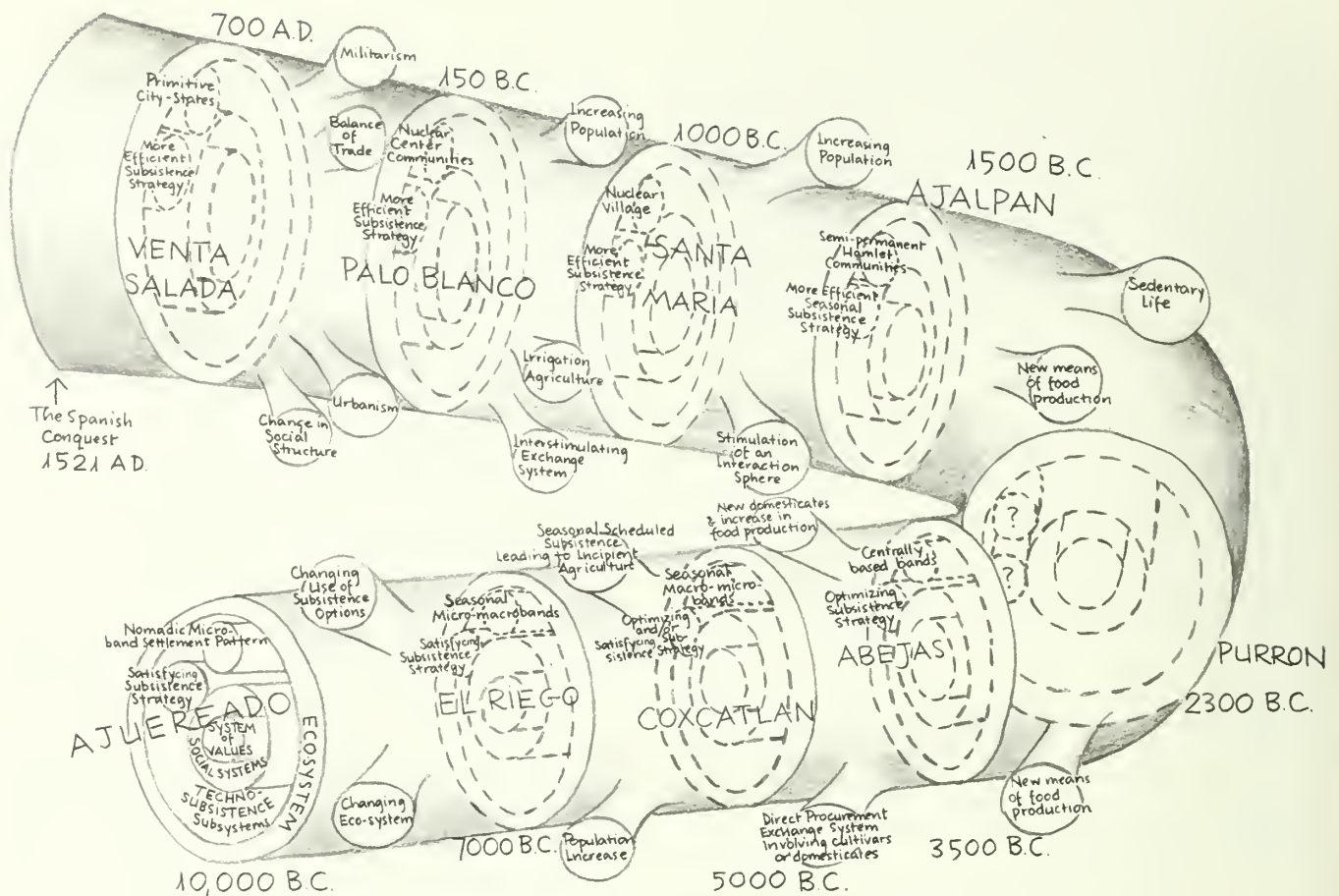


Fig. 201. A systemic model of cultural change in prehistoric Tehuacan.

CHAPTER 8

Summary of the Cultural Sequence and Its Implications in the Tehuacan Valley

Richard S. MacNeish

IN THE PREVIOUS PAGES we have described both our excavations and our survey techniques, as well as the contexts of the ecofacts and artifacts in their various occupational layers. Further, we have touched upon related materials discovered in our archaeological reconnaissance. This information, as well as that found in Volumes 1 through 4, will be the basis on which we

shall construct, in Volume 6, the activities of the various cultural subsystems of each cultural system or phase in our long sequence in the Tehuacan Valley, and we shall relate these systems to other systems on the same horizons in the sequential interaction spheres of Mesoamerica. Also, in Volume 6, analysis of our sequence, in light of other interacting ones, will yield

hypotheses about the conditions or causes that brought about the change from one cultural system to the next and, as well, we shall attempt to test these hypotheses with comparative data. Such a study will be a major undertaking; nevertheless, even in this brief summary for such a large volume, we can allude to some of the more general aspects of that volume, which we shall present in terms of some of the settlement pattern data to be little emphasized in our final tome.

On the earliest level, roughly from 10000 to 7000 B.C., the Ajuereado Phase is characterized by a limited number of small temporary sites randomly distributed in the valley and in no definite clusters. The size of the sites and the number of fireplaces in excavated components both suggest that all were *Microband encampments composed of 2 or 3 nuclear families or linked individuals*. Further, there is no evidence from any of the Ajuereado sites that they were occupied for longer than either one wet or one dry season; moreover, evidence from the five components that had the more definite seasonal indicators indicates that all occupations were of a single season or less. This strongly suggests nomadic groups. The problem now is to discover whether these groups were *seasonally* nomadic or free-wandering, a difficult question to answer precisely. When we define *seasonality* as *annual cyclic variation reflected in the economic and/or social pattern* the evidence of seasonality from Ajuereado camps is weak. Hunting and trapping, their prime means of exploiting the natural resources, takes place at all camps at all seasons. However, there is some evidence for some sort of *scheduling*, by which we mean a *hierarchy of priorities resulting in the temporal ordering of selected options*. Options are defined as *alternatives of economic or social action*. The fact that at least five of the nine dry-season camps occurred at water-source locations (the El Riego Oasis or the humid river bottoms) can be interpreted as indicating that, either consciously or unconsciously, there was a high priority during the dry season for living, that is, undertaking economic or social action in this selected type of location rather than in any of the many other alternative ones. The limited number of Ajuereado sites scattered all over the valley has two implications, one concerning territoriality. If one defines a *territory* as an *area from which a group regularly procures resources*, then, either several groups with no defined territories used the whole valley in a haphazard manner or a single group roamed the whole valley as its territory. The other implication concerns population. The limited number of sites, all of small size and all of short duration, certainly indicates a very small popula-

tion during this 3,000-year period. We have estimated between one and five families, but this is, at best, a guess. The Ajuereado Phase, then, had a very small population, which consisted of microbands living in temporary camps in no well-defined territories. They moved regularly as their food resources necessitated it, which movement probably only accidentally correlated with changing seasons; however, their movements may be considered scheduled from the standpoint that, in the direst dry season, they did perhaps by necessity move into the few well-watered environs. This way of life or cultural system we have classified as a *Nomadic Microband* community pattern. Studies of materials from sites of this type seem to indicate a technology that was not very complex, a minimal practice of ceremonialism, and a subsistence pattern that was predominantly one of hunting and trapping, with leaf and seed collecting and fruit and pod picking occurring only during certain seasons as sorts of subsistence options. In economic terms, one might say they had a *satisfying strategy*; that is, one that *aims at deriving less than the highest level of defined objectives (food) for reasons of risk*. We believe that further reconstruction of this way of life by ethnographic analogy is fruitless, for few, if any, living primitive peoples are directly analogous and those that may seem similar, such as the Alacalut, do not represent this pristine evolutionary type at all, but rather evince a few minimal similarities because they have regressed from a more developed stage, due to decimation and social disintegration under European contact.

Our next community pattern, *Seasonal Micro-Macrobands*, represented by the El Riego Phase at 7000 to 5000 B.C., does, however, have definite analogies to a whole host of living primitives, such as the U. S. Great Basin peoples, the Kalahari Bushmen, some Australian aborigines, and others. Here, perhaps, is some basis for using ethnographic data for archaeological reconstruction or construction. El Riego peoples seem to resemble these ethnographic examples in their well scheduled system of seasonality, wherein, in certain regions or territories, groups existing as microbands in the dry seasons coalesce into macrobands in the lush seasons. Further, certain subsistence activities were scheduled for these seasons: hunting and trapping in the dry season, seed collecting in the spring and summer, and fruit picking in the fall. The general economic strategy is, however, still a satisfying one, and they still take the easy but safe way to procure their basic sustenance. On the basis of the number of sites and the size and duration of components, we have estimated that the population was noticeably

larger than that during Ajuereado, perhaps 100 to 150 people.

Thus, the new community pattern, Seasonal Micro-Macrobands, is based on new settlement pattern types, changes in subsistence pattern, advanced technology, new ceremonial manifestations, and probable change in social organization; in fact, the whole new culture system was a far cry from the Ajuereado community pattern of Nomadic Microbands and its concomitant cultural system. Now the question arises as to whether or not these changes were due to population pressures and settlement pattern factors. In the Ajuereado time period population does not seem in any way to be a major force in bringing about cultural change, not only because populations were extremely small, but also because the significant population rise in the period of the two phases does not come until late El Riego times, long after other major changes had taken place. Also, macrobands and the scheduled seasonal settlement pattern occur during El Riego times and not before. Thus, it seems conclusive that population and settlement pattern factors were the result, not the cause, of the shift from the Ajuereado way of life to that of El Riego, and that the real conditions bringing about this event were the environment changes, acting in a negative feedback relationship with the changing use of subsistence options, which had started relatively early in Ajuereado times.

The way of life, or culture system, of the Coxcatlan Phase (5000-3400 B.C.) differs somewhat from that of El Riego in terms of its technology and a subsistence subsystem that now includes incipient agriculture. The settlement pattern is basically the same, however, and populations have increased only slightly. We have called the Coxcatlan community pattern *Seasonal Macro-Microbands*. Three-five clusters of the twenty-five components have been interpreted as band territories. Coxcatlan has seven settlement pattern types, six of which occurred in El Riego; the one new type is the dry-season macroband open camp, often found in the Travertine Slopes zone. However, the proportion of Coxcatlan types is rather different from that of El Riego in that there are more macroband encampments than microband ones, along with a general tendency for both macroband and microband camps to be occupied for longer periods, no doubt because increasing amounts of storable domesticates allowed them to remain sedentary for longer periods. Further, macroband camps of Coxcatlan not only were occupied longer, they were also larger. Thus, we have guessed that populations increased to perhaps 100 to 400 people in our valley.

Our studies of seasonal indicators in some of the components show that a well-defined system of scheduled seasonality probably existed. Generally speaking, microband groups coalesced in the spring or summer to collect plant remains and, during the early part of their stay, may have done some planting of those domesticates that reached fruition after the spring seasonal plants were gone, thereby allowing them to stay in these spots for additional periods. However, food surpluses do not seem to have been sufficient enough to allow them to stay in one spot all year long. In dry seasons macrobands either broke up into microbands and moved to more well watered spots, or, as macroband groups, shifted to spots along the waterways in the travertine or alluvial slopes. Of course, there may have been some groups who remained as microbands all year, but they still would have shifted their locations seasonally in some definite pattern. Thus, while the settlement pattern of Coxcatlan bore many resemblances to that of El Riego, there were differences in it, as well as in the material culture, the subsistence, and other aspects of their cultural system. There is some evidence that population and settlement pattern factors were involved in causing all these differences. On the simplest level, the noticeable increase in population in late El Riego, occurring just before the slightly different Coxcatlan way of life, suggests that population increase somehow "caused" the change. Also, we would like to suggest that the continued use of the El Riego seasonally-scheduled settlement pattern was a causative factor in the development of the new Coxcatlan subsistence pattern, specifically, the domestication of plants and their use. We would guess that the El Riego seasonally-scheduled settlement pattern often involved returning to a certain seed, fruit, or food collection area each year. This would have led to the clearing (weeding) of that spot as well as to the enrichment of soils by human and animal refuse, unconscious seed selection, and various other mechanisms for changing the ecosystem. Such a process provided a new artificial environment for botanical foodstuffs and might have occasionally led to various genetic changes in those species involved. Eventually, after tens of thousands of visits by thousands of individuals over hundreds of years, it may have dawned on some individual or individuals that, in many locales, a seed or leaf placed in the ground begat a plant with seeds or leaves, and that larger seeds or leaves planted often begat plants with larger seeds or leaves (i.e., more food). The use of such knowledge may, in turn, have led to *horticulture*, i.e., *an emphasis on planting individual domesticates or*

cultivars in limited areas, locales, plots, or gardens (gardens=horti), which often take relatively little or no energy investment in preparation or maintenance. By domesticate we mean a plant that is genetically different from its wild ancestor due to man's selection (conscious or unconscious), and a cultivar we define as a plant that man causes to grow or plants (consciously or unconsciously) in a new environment which often results in morphological, not genetic, changes in the plant.

The use of horticulture most certainly would have resulted in an increased food supply, and this, in turn, would often have been a factor in increasing the population and changing the settlement pattern (such as allowing people to stay in one spot longer). Further, greater increases in population would have necessitated more food and more use of horticulture. Thus, a negative feedback system between a subsistence subsystem and a settlement pattern subsystem created spiraling changes that would have brought about changes in the rest of the cultural system. We believe that it was this sort of process that brought about the change from the El Riego way of life to that of Coxcatlan, and that, if such a process did in fact occur, it was the subsistence changes and population increases involved in this negative feedback system that were the key factors in triggering this state of disequilibrium.

It is also our opinion that this sort of process continued throughout Coxcatlan times and that this process, with the addition of, or at least the diffusion into the region of, new domesticates, including the more productive tripsacoid variety of corn (perhaps as elements in the newly developed direct procurement exchange system) brought about the Abejas culture (3400–2300 B.C.) with its new type of community pattern. In Abejas we find one new settlement pattern type, waterway hamlets, as well as many macroband camps. Further, evidence of multi-season macroband camps and multi-season microband camps from the same activity areas in excavations with good season indicators, suggest that the size of the group fluctuated with the seasons. Also, evidence from the surface hints that the macroband occupations with less good seasonal indicators should be termed multi-season macroband camps, or, at least, wet-season or dry-season macroband camps. The microband camps are represented by small sites in a wide variety of micro-environments and by small activity areas. The majority seem to be for a single season and are often associated with a larger macroband. Further, the thirty components cluster into three or four groups, or band

territories, each of which has one or more large components with a relatively sedentary occupation. All this suggests a community pattern of *Central-based Bands*, wherein hamlets or multi-season macroband camps serve as a central or home base for a series of microband groups, which would move out from it in search of food during certain brief periods. We have defined centrally-based bands or communities as those in which *personnel representing the full biologic population from more than one home base, carry out the maximum range of socio-political activities*. It is our interpretation that these more stable hamlets or macrobands or central bases of longer duration came into being because of the increasing amount of storable horticulture and seed surpluses. The food remains and seasonal indicators from excavated components suggest, as an ideal pattern, one in which larger groups usually collected ripening seeds and pods and animals during the spring while they planted their horticultural crops, and in the summer collected other ripening wild foods and animals, but supplemented this diet with the foods from domesticates or cultivars that had reached fruition. Fall may have seen them still collecting plants or animals, but now using the domesticated or cultivated fruits that had ripened, as well as dipping into their surpluses from the summer harvests. The winter dry season, with minor amounts of wild foods available, would have presented a problem, but groups with summer surpluses of domesticates, cultivars, or storable seeds could remain sedentary as hamlets or macrobands until they were able to start their cycle over again in the spring. Those without surpluses would have to break up into microbands to survive in other areas as best they could on wild foods (mainly animal). At best, it would not have been a stable situation, for dry years, poor harvests, and various other exigencies could completely disrupt this scheduled system. In fact, one could very well speculate that some, if not all, of the Abejas people had moved away from the older satisfying strategy to a more *optimizing strategy*, that is, a *strategy (conscious or unconscious, long-term or short-term) that aims at deriving the highest possible levels of the defined objective* (in this case, storable food surplus) *without consideration of potential risk*, such as drought, disease, pillage, etc.

Our too limited data does not allow us to speculate about the way of life of the Purron Phase or about how it developed from the preceding Abejas Phase, but fuller data on the following phase, Ajalpan (1500 to 850 B.C.), allows us to speak of its settlement pattern and speculate on how it came into being. Ajalpan

sites are not numerous; most components come from two excavations near Ajalpan. Although our excavation of house structures was very limited, four excavated floors with possible structures in a line and elongate distribution of refuse, including wattle-and-daub, paralleling waterways of 18 more components, indicate that the dominant settlement pattern type was (linear) waterway hamlets. One microband camp and one macroband camp, as well as bones of winter deer in Ajalpan floors, suggest that occasional trips were made from the hamlets for various reasons related to obtaining food. It is our belief that these settlement pattern types composed two or three communities, which we are calling *Semi-permanent Hamlet Communities*. Except for their more sedentary nature and slightly larger population, the settlement pattern of Ajalpan is not radically different from that of the Late Preceramic. While the negative feedback process between the exchange and subsistence subsystems may have continued, it would now appear that the new dominant subsistence technique—wet season barranca agriculture with its concomitant food surpluses—was a major causative factor in the change from Abejas to Ajalpan. We have defined *agriculture* as *the planting of multi-seeds of domesticates or cultivars in definite fields (agri=fields) requiring preparation and maintenance as well as harvesting procedures*. This means-of-production factor, with the evidence for major cultural interactions with other developing regions of Mesoamerica, and the use of more productive corn hybrids, all seem to be causes of changes in settlement pattern aspects and populations, as well as other cultural subsystems, rather than the reverse. Thus the latter are results, not causes, of cultural change.

The relationship between subsistence techniques and population, however, seems to change during Santa Maria, and between 1200 B.C. and 850 B.C. in Ajalpan times the population may have tripled and increased as much again during Early Santa Maria times (900 to 500 B.C.). Our chronological evidence seems to indicate that, following this population shift and change to the nuclear village community pattern, there is the development or adoption of a new subsistence technique—irrigation agriculture and orchard culture. It would almost appear as if the old single wet-season crop from barranca agriculture could not supply sufficient food for the increasing number of hungry mouths, so that they were forced to develop or adopt a new type of multi-season agriculture that could meet the population demands. Although the evidence is far from perfect, there does seem to be some vindication for Bosrup's hypothesis that population

and settlement pattern features may be causative factors in bringing about new means of food production. This new subsistence strategy, which developed in Late Santa Maria and continued into Palo Blanco and later, may be termed a *more efficient strategy*, that is, one that *aims at deriving the highest possible level of the defined objective (food production) which can be maintained over a long period of time in view of the attendant risk*.

Besides these changes in population and food production, major changes in the settlement pattern are seen in Santa Maria. Two new settlement pattern types increase throughout the period, linear waterway villages and nuclear valley villages, while, near the end of the phase, a single nuclear valley town appears. Clustered around these nuclear centers in four or five different locales are a series of small hamlets and a few camps. This configuration we have called the *Nuclear Village* community pattern. Although the subsistence and population factors may have played a part in its formation, a key factor seems to have been some sort of new exchange system that involved interaction with and interstimulation from other Mesoamericans who had earlier developed a similar pattern and a whole new socio-religious cultural subsystem. Although our limited data from Santa Maria components does not allow us to truly understand this interaction process with its strong religious and cult overtones, it would appear that it was a major factor in bringing about other changes in the realms of technology, trade, social organization, religion, and perhaps even a system of values, i.e., subsystems of its cultural system.

Beginning with the Palo Blanco Phase (150 B.C. to A.D. 700), we have much less data from excavation, many more survey sites, and far greater cultural complexity, so our understanding of the way of life, or cultural system of the period, and the causes of cultural change is much less complete. As far as the settlement pattern data is concerned, a whole series of new types occur. These types appear in seven or eight clusters over the valley and differ only slightly between early and late Palo Blanco times. All clusters but one have within them a single nuclear town, usually on a hilltop, but some, mainly in Early Palo Blanco, occur in the steppes, as did the single example from Late Santa Maria. About half of these centers are associated with secondary or diffuse towns and all have villages and hamlets in the clusters. A few have salt production sites and camps. Within the clusters themselves there seems to be a hierarchy of kinds of settlements oriented towards a single more elaborate, well-planned town with more centralized ceremonial

structures or features. These we believe to have been the administrative, ceremonial, and political centers of the clusters or communities. Further, the towns and villages themselves have an internal hierarchical structure, with their centers, their largest mounds, their most extensive plazas, best architecture, and most elaborate ceremonial structures surrounded by smaller and smaller mounds or structures and poorer architecture, or surrounded by other sites with these latter characteristics. All of the above has led us to classify these clusters as *Advanced Nuclear (or Nucleated) Center Communities*, and occasionally, because of their ceremonial emphasis, we have referred to them as *Dioceses*.

As far as population is concerned, there is considerable evidence of a huge increase from Santa Maria to Palo Blanco times, and some indication that the population of Late Palo Blanco was slightly less than that of the early part of the phase. It seems probable that the early population increase is the result of increased food supplies from irrigation agriculture (first utilized in Santa Maria), and the later increased irrigation networks in Palo Blanco may have been in response to increasing populations. Thus, again, another type of negative feedback system may have been established between the subsistence subsystems and population increases. One is also tempted to see the increasing nucleation and organization, of both large sites and communities, as a response to administering the increasing water-control systems—almost in a Wittfogelian manner. The shift from the relatively simple life of Santa Maria to the very complex one of Palo Blanco was probably very complex in itself, not to be explained by only the two factors of population and hydraulic works, important as they may have been. Thus, as of this time of our investigations, we cannot explain fully how and why Santa Maria culture developed into that of Palo Blanco, nor can we explain how and why the population and nucleation of communities of Early Palo Blanco declined during the late part of the phase. Failure of the irrigation systems and the resultant salting up of the soil and the like seem to us obvious explanations, but our fine irrigation studies gave no evidence to validate this hypothesis. Obviously, more study is needed on this whole period.

The transition from Palo Blanco to Venta Salada is also poorly understood. Here, however, we have hope of some new answers, as Edward Sisson is now (1970–73) undertaking investigation of this Postclassic phase under the R. S. Peabody's Coxcatlan Project, and obviously what we write here is tentative and subject to

change when the results of the Coxcatlan study are completed. However, even with our present, limited data, it is obvious that Venta Salada had new settlement pattern types that clustered into a new community pattern, which we call *Primitive City-States*. This new community pattern is perhaps best exemplified by the Late Venta Salada Phase and cultural system, which lasted into the early days of the Spanish Conquest, and some of our archaeological information should eventually be supplemented by ethnohistorical studies. The settlement pattern of the Early Venta Salada Phase has no such fine documentation and seems to be, in part, transitional between the pattern of Late Palo Blanco and that of Late Venta Salada.

Our Late Venta Salada sites are clustered in three or four very definite areas, and these territories can be correlated with three or four ethnohistorically documented political entities, perhaps cacicazgos or city-states. Further, each of these entities has a city ranked as a capital in early Spanish documents. These are, from south to north, Teotitlan del Camino, Coxcatlan, Tehuacan, and Zapotitlan, with the possibility that the Zapotitlan area had a city in it in Early Venta Salada, but, by Late Venta Salada, (Tr 319) was a smaller settlement under the sway of another city capital, such as Mezontla to the west of our area of exploration, or perhaps even Tehuacan to the east. Associated with each of these capitals is a series of towns (from two to four in each community) that occur on either hill flanks or hilltops, with the latter often having some sort of fortification or evidence of defenses. The towns within the territories of the city-states of Teotitlan del Camino and Coxcatlan can all be correlated with towns shown on sixteenth-century Spanish maps of the areas, and other towns or villages are mentioned as being subject to those city capitals. Surface collections and preliminary excavations from some of the towns and cities hint that, within them, were barrios of full-time specialists, and that there were two classes of structures, perhaps reflecting two castes of nobles and commoners. Clustered around the towns, or clustered together within the state territories, are a series of communities or sub-communities that are mainly composed of villages, hamlets, or specialized sites. Of the hamlets, many show that specialized activities were undertaken, such as salt production, flint-knapping, and mold-made pottery making, and two hamlets and two villages have evidence of military activities. Besides all of these, there were at least 18 sites without habitation that seemed involved in a salt industry, and many shrines indicating specialized religious activities. Thus, some of the villages, many of

the hamlets, and most of the specialized sites were not far different from the barrios in the towns or cities, and it is our belief that all were probably composed of commoners subject to the ruling class or caste, the "principalos." Therefore, using just the archaeological data, there is good evidence of major change in settlement pattern types, community pattern, and even in social and political organization and technology, between Palo Blanco and Venta Salada.

Population increased again from Late Palo Blanco to Venta Salada times, but the major increase seems to be during Late Venta Salada. Further, although the production of agricultural foods goes up and the number of water-control features increases, these occur mainly in Late Venta Salada and fundamentally are mere extensions of those of Palo Blanco. Thus, there seems to be little evidence that either population or settlement pattern, or even the relationship of these two to subsistence or means of production, were basic causative factors in the genesis of the Late Venta Salada Phase. Obviously, the causative factors involved in the rise of city-states is a complex matter, but trade relations, economic factors involving a balance of trade, militarism, urbanism, and various social factors all seem more fundamental in bringing about this cultural development than do either population or new settlement types or community pattern factors. At this evolutionary level, the latter seem to be results rather than causes.

Throughout this very brief summary, with its heavy settlement pattern overtone, we have hinted at the causes or conditions that have brought about the changes from one cultural system or phase to another. As stated earlier, in our final volume both the cultural systems and the analysis thereof (to determine the conditions causing the change) will be dealt with more fully. We believe, however, it is worthwhile to present in outline form, as the conclusions to this volume, our speculations about these causes of culture change, from the standpoint of the wider implications of our data herein, and to give hypotheses susceptible to testing by ourselves or by others with similar comparative archaeological information.

Our preliminary analysis suggests that

- I. A cultural system like that of Ajuereado, *Hunting Nomadic Microbands*, may develop into a system like El Riego, *Micro-Macrobands with a seasonally scheduled subsistence system*, in regions with

NECESSARY CONDITIONS

- A. considerable ecological diversity that yields food in different micro-environments at different seasons of the year, *and where*
- B. a number of potentially domesticated and/or cultivated or tamed plants and animals occur, *at the period when*

SUFFICIENT CONDITIONS

- A. a development of a series of seasonally adaptive subsistence options, with their necessary ecosubsistence knowledge, *coincides with*
- B. an ecosystem change that reduces the faunal subsystems (biomass) to such an extent that extensive hunting or animal collecting or a single subsistence option is no longer tenable in terms of energy output and input.

- II. Our data also suggests that *if the newly developed El Riego type, a system with a Micro-Macroband settlement pattern and a seasonally scheduled subsistence, occurs in an ecosystem with*

NECESSARY CONDITIONS

- A. potentially domesticable or cultivated plants and animals, *and*
- B. great ecological diversity including marked seasonality, *and*
- C. the region has easy communications and interaction with other areas of great ecological diversity or lush ecological uniformity, *and if*

SUFFICIENT CONDITIONS

- A. the population of that system increases to a point where the equilibrium in terms of energy flow between the ecosystem and subsistence is upset, *occurring at about the same time that*
- B. horticulture gradually comes into being (and perhaps tamed animals?) due to a scheduled subsistence system, *then this system will evolve into one that has a Macro-Microband settlement pattern subsystem with a seasonally scheduled subsistence system with horticulture (or tamed animals), i.e., the Coxcatlan type of system.*

- III. Further, our analysis indicates the possibility that *if a system with a Macro-Microband settlement pattern with a seasonally scheduled system, like Coxcatlan, includes*

NECESSARY CONDITIONS

- A. horticulture and domesticated animals, *that*

B. occur in a zone of great ecosystem diversity, *that*

C. is geographically accessible to similar zones where horticulture has developed, *and it has*

SUFFICIENT CONDITIONS

A. a stimulating interaction involving the exchange of cultivars and domesticates occurring between these types of ecozones, *then* a system like Abejas with a *Central-based Band type of settlement with a seasonally scheduled subsistence system*, which includes both horticulture and agriculture of a wide variety of plants, *will develop*.

- IV. Also, our rather meager data from Tehuacan indicates the possibility that the Abejas-type system of *Central-based Bands with horticulture may have evolved into a system*, like that of Ajalpan, with *Semi-permanent Hamlet Communities with subsistence agriculture*, if the

NECESSARY CONDITIONS

- A. exchanges continue to occur in the interaction sphere between other culture types, in areas of lush uniformity, and one like Abejas, in a zone of more severe diversity, *and if*
 B. some of the cultivars or domesticates of the latter's horticulture are susceptible to more productive hybridization or agriculture, *and if*

SUFFICIENT CONDITIONS

A. an optimizing subsistence strategy is utilized which results in a shift from horticulture to agriculture.

- V. It would appear that *if* a culture type like Ajalpan—*Semi-permanent Hamlet Communities with subsistence agriculture*—

NECESSARY CONDITIONS

- A. exist in an arid environment with possibilities of water control, *and are in a position where*
 B. exchanges are possible with areas that have developed institutions that have full-time specialists able to organize other aspects of society, *then*

SUFFICIENT CONDITIONS

- A. a population increase may lead to the development of new and more efficient subsistence systems involving water control (irrigation) *that will be*
 B. organized by the institutions diffusing into them from lush areas, *so that*
 a new culture system such as Santa Maria with

its *Nuclear Village community pattern with an irrigation-based subsistence system will evolve*.

- VI. Although our analysis and evidence is less complete, and the cultural systems involved are more complex, it seems that *a culture type*, like Santa Maria,

NECESSARY CONDITIONS

- A. in an arid environment with possibilities of a water control technique, *and with*
 B. a specialized (religious) institution that can organize other aspects of society, *and with*
 C. increasing populations, *and*

SUFFICIENT CONDITIONS

A. taking on an organized full-scale irrigation subsistence system, *will evolve into* a culture system like Palo Blanco that had an *Advanced Nuclear Center community system*, with an *efficient subsistence strategy and various other complex culture subsystems*, which we have yet to adequately define.

- VII. Although our information is even less secure, one might speculate that *an Advanced Nuclear Center type*, like Palo Blanco, *might evolve into* a *Primitive City-State*, like Venta Salada, if

NECESSARY CONDITIONS

- A. a series of complex culture systems or systems that are urban or semi-urban are
 B. located close enough to each other to make for some sort of competition between them, *occurs in conjunction with*

SUFFICIENT CONDITIONS

- A. the rise of militarism,
 B. the growth of competitive economic and political subsystems involved with problems of the balance of trade, *and*
 C. various changes in other aspects of the social organization (which, as yet, we do not understand).

Thus, even at this early juncture in our studies of the prehistoric cultural developments in the Tehuacan Valley, we can postulate, albeit prematurely, some hypotheses about why they happened. These may lead us or others to test them with the hope of making generalizations about culture change. If any of the data in this volume or the hypotheses just presented are of any use in such endeavors, we shall feel satisfied with the efforts we have put into this volume, for then archaeology will be more than "anthropology or noth-

ing," and will be moving in the direction of becoming a *science of past human activity and the product or*

results thereof, perhaps conducted within the framework of systems theory.

B I B L I O G R A P H Y

- Anderson, James E.
1967 "The Human Skeletons." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Brunet, Jean
1967 "Geologic Studies." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Byers, Douglas S.
1967 "The Region and Its People." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Callen, Eric O.
1967 "Analysis of the Tehuacan Coprolites." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Charlton, T. H.
1968 "Post-Conquest Aztec Ceramics: Implications for Archaeological Interpretation." *The Florida Anthropologist*, vol. 21: 96-101.
1970 "Ethnohistory and Archaeology: Post-Conquest Aztec Sites." *American Antiquity*, vol. 34: 286-294.
- Cook, S. F., and L. B. Simpson
1948 *The Population of Central Mexico in the Sixteenth Century*. Ibero-Americana, No. 31. University of California Press.
- Cutler, Hugh C., and T. W. Whitaker
1967 "Cucurbits from the Tehuacan Caves." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Flannery, Kent V.
1967 "The Vertebrate Fauna and Hunting Patterns." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Hunt, Eva
1970 "Irrigation and the Socio-Political Organization of Cuicatec Cacicazgos." Manuscript published in a revised form as Hunt 1972.
- 1972 "Irrigation and the Socio-Political Organization of Cuicatec Cacicazgos." *The Prehistory of the Tehuacan Valley*, Vol. 4, *Chronology and Irrigation*, ed. by Frederick Johnson. Austin: University of Texas Press.
- Johnson, Frederick, and R. S. MacNeish
1972 "Chronometric Dating." *The Prehistory of the Tehuacan Valley*, Vol. 4, *Chronology and Irrigation*, ed. by Frederick Johnson. Austin: University of Texas Press.
- Johnson, Irmgard W.
1967 "Textiles." *The Prehistory of the Tehuacan Valley*, Part IV, Vol. 2, *Nonceramic Artifacts*, ed. by D. S. Byers. Austin: University of Texas Press.
- Kaplan, Lawrence
1967 "Archaeological Phaseolus from Tehuacan." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- MacNeish, Richard S.
1967 "An Interdisciplinary Approach to an Archaeological Problem." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
1967 "A Summary of the Subsistence." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- , A. Nelken-Terner, and I. W. Johnson
1967 *The Prehistory of the Tehuacan Valley*, Vol. 2, *Nonceramic Artifacts*, ed. by D. S. Byers. Austin: University of Texas Press.
- , and F. A. Peterson
1962 *The Santa Marta Rock Shelter, Ocozocoautla, Chiapas, Mexico*. Papers of the New World Archaeological Foundation, No. 14. Provo, Utah.
- , F. A. Peterson, and K. V. Flannery
1970 *The Prehistory of the Tehuacan Valley*, Vol. 3, *Ceramics*, ed. by R. S. MacNeish. Austin: University of Texas Press.
- Mangelsdorf, Paul C., R. S. MacNeish, and W. C. Galinat

- 1967 "Prehistoric Wild and Cultivated Maize." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Nagel, Ernest
1964 *The Structure of Science*, 2nd ed. New York: Harcourt, Brace, and World.
- Nicholson, H. B.
1971 "Religion in Pre-Hispanic Central Mexico." *Handbook of Middle American Indians*, vol. 10, *Archaeology of Northern Mesoamerica, Part One*, ed. by G. F. Ekholm and Ignacio Bernal. Austin: University of Texas Press.
- Noguera, Eduardo
1940 "Excavations at Tehuacan," trans. by Suzannah B. Vaillant. *The Maya and Their Neighbors*, pp. 306-319. New York: Appleton.
- Odum, Eugene P.
1971 *Fundamentals of Ecology*, 3rd ed. Philadelphia: Saunders.
- Paredes Colin, Joaquin
1960 *El Distrito de Tehuacan*. Mexico: Tipografia Comercial "Don Bosco."
- Paso y Troncoso, Francisco del (Ed.)
1905-6 *Papeles de la Nueva Espana* (PNE). 7 vols. (segunda serie). Madrid: Est. Tipografico Sucesores de Rivadeneyra.
- Pendergast, D. M.
1962 "Metal Artifacts in Prehispanic Mesoamerica." *American Antiquity*, vol. 27:520-545.
- PNE, see Paso y Troncoso, Francisco del
Radiocarbon Supplement, American Journal of Science. New Haven, Conn.
- Ruz Lhuiller, Alberto
1968 *Costumbres Funerarias de los Antiguos Mayas*. Mexico: Universidad Nacional Autonoma de Mexico.
- Sisson, Edward B.
1973 *First Annual Report of the Coxcatlan Project*. Robert S. Peabody Foundation for Archaeology, Andover, Mass.
- , and W. H. Doelle
1971 "Un Pueblo Postclasico del Valle de Tehuacan." Submitted to the *Boletin*. Mexico: Instituto Nacional de Antropologia e Historia.
- Smith, C. Earle, Jr.
1967 "Plant Remains." *The Prehistory of the Tehuacan Valley*, Vol. 1, *Environment and Subsistence*, ed. by D. S. Byers. Austin: University of Texas Press.
- Vita-Finzi, C.
1970 "Alluvial History of Central Mexico." *Nature*, vol. 227, no. 5258. St. Albans, England. Pp. 596-597.
- Wauchope, Robert
1956 *Seminars in Archaeology: 1955. American Antiquity*, vol. 22, no. 2, pl. 2. *Memoirs*, No. 11. Salt Lake City, Utah.
- Wiley, Gordon R., and P. Phillips
1962 *Method and Theory in American Archaeology*, 2nd ed. Chicago: University of Chicago Press.
- Woodbury, Richard B., and J. A. Neely
1972 "Water Control Systems of the Tehuacan Valley." *The Prehistory of the Tehuacan Valley*, Vol. 4, *Chronology and Irrigation*, ed. by Frederick Johnson. Austin: University of Texas Press.

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